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ELECTRICAL WEST

National

MOISTURE RESISTING

FLAME RETARDING

SAFECOTE "FIRE-STOP"

Wires & Cables

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  CODE · INTERMEDIATE · THIRTY PER CENT · PERFORMANCE TEST · NON-METALLIC SHEATHED CABLE · SPECIAL COMPOUNDS
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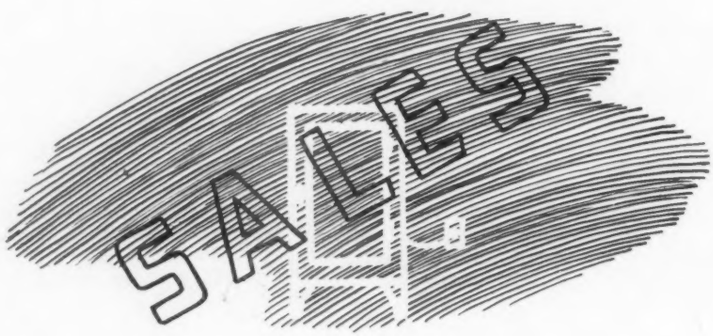
NATIONAL ELECTRIC PRODUCTS
NE
WIRING SYSTEMS 6
WIRES AND CABLES

"The Wire and Cable that is Moistureproofed"

National Electric
PRODUCTS CORPORATION
Pittsburgh, Pa.

PACIFIC COAST SALES OFFICE and WAREHOUSE · 400 POTRERO AVE. · SAN FRANCISCO, CALIF.

MR. DEALER WE THANK YOU!



More electric refrigerators have been sold during the past few months than ever sold before in the same period.

Our refrigerator advertising campaign has been productive.

And our output of kilowatt hours has grown proportionately.

For this we thank you.

We are doing—and will continue to do—everything we can to further the interests of the electrical industry.

Any suggestions you can offer as to how we can be of still greater service, to you or your community, will be very welcome.

SOUTHERN CALIFORNIA EDISON COMPANY LTD.

Edison

7-35

ELECTRICAL WEST (with which is consolidated The Journal of Electricity, July, 1935, Vol. 75, No. 1. Published monthly by the McGraw-Hill Company of California, 883 Mission St., San Francisco, Calif. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. Additional entry as second class matter at the post office at Los Angeles. Printed in U. S. A. Subscription rate in U. S. and U. S. possessions, $2 per year; Canada, $2.50 including duty; all other countries $3 gold (thirteen shilling). Single copy, 25c. Copyright, 1935. McGraw-Hill Company of California.

ELECTRICAL WEST

With which are consolidated the "Electrical Journal," the "Journal of Electricity, Power and Gas," and the Journal of Electricity."

ESTABLISHED 1887

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• NRA TUMBLED down like a house of cards last month, and now the various branches of the industry are looking at the Deal to see whether they can salvage a fairly good hand from the big shuffle. In "Little Man, What Now?" an appraisal of the situation is made.

• SMALL TOWNS are the places that should get the attention, Electra's current husband suggests. It is from their successes in organizing the small towns that agitators learn to expand to big cities.

• SECOND prize winners in the recent Pacific Coast Electrical Association contest for the best answers to the problems which confront the industry are printed this issue. The business and cooperation and goodwill papers appear starting page 16—the engineering or operating-economics papers begin page 38. Many good ideas in all of them, and some startlingly different from the first prize winners.

• HOLLYWOOD couldn't produce movies so convincing and effective in building load as those which the regular staff of a Western utility make, right on the home grounds and with real farmers telling their story of electrical benefits.

• AIR CONDITIONING sales are costly unless you know how to sift out the prospects, and in Cooperation on Parade this month the method developed by one company may be helpful to others with a similar problem.

• IN OUR regular department turned over to university staffs to tell of their research in electricity, a professor dives into that complex problem, taxation of utilities, and makes some important discoveries it is well all of us should know.

• SIGNIFICANT is the trend illustrated by the application of the good old vacuum cleaner idea of the loading and unloading of dry materials, such as cement. Longshoremen, by their pugnacious and tyrannical attitude are forcing the development of quiet, orderly, and unwasteful machines which will take their jobs over.

• BILL JONES makes a mighty pertinent suggestion that if the industry wants its industrial relations to be really effective it throw away most of its text books and elaborate plans and just study some of the technique of that master of unification—Tammany Hall. He also hints rather broadly just what it is that the Tiger does to obtain such uncanny loyalty.

Sales Talks that SOLD Appliances

CASE HISTORY NO. 7
SELLING AN ELECTRIC MIXER

FROM HIS own experience at home Bill Smith, master salesman, knows that the electric mixer, if properly sold, is the best goodwill builder and repeat business getter in the store. He knows that whoever learns to use it for everything feels mighty good toward him for having sold it; feels good about its low cost of operation for all the service it renders; feels better about rates, therefore; and tells all her friends. Yet Bill knows also that too many mixers have just been "bought" and that the customers who have bought without fully appreciating the value of full use, are not getting their money's worth out of them and hence are not advising more friends to buy.

Bill has set up an attractive window display, using a revolving table which shows all the fittings and uses for his mixer. He has schooled himself in demonstrating his mixer thoroughly and easily. So when Mrs. Brown enters the store to look at a mixer he approaches her with a definite knowledge of his merchandise, backed up by personal experience with it. He greets Mrs. Brown with a straight assurance of what the mixer will do for her.

BILL: "It is surprising how useful that gadget is, Mrs. Brown. It is the handiest kitchen helper a woman ever had. Beats any dozen housemaids I ever saw. Let me show you how easily you can do some of the mean, tiresome jobs of preparing food with this mixer. *(Demonstrates as he talks.)* You know, now that we have one at home we don't know how we ever got along without it."

MRS. BROWN: "They've appealed to me, but somehow I wonder if they aren't more bother than they are worth."

¶ Bill recognizes the resistance of HABIT, one of the hardest to overcome. Many women have formed hard and fast habits in doing housework, preparing food especially. So he sets up against her established habits, the desirability of changing to new and better habits that will save her time and effort. Notice how he tackles that thought:

BILL: "A lot of bother? I can see how it might appear so. But really that is a matter of learning to use it—which is very simple, really—and of making it easy to use by setting it in your kitchen where it will be all ready to use every time you need it. Then it becomes second nature to let it do your tiring jobs for you, instead of doing them slowly and tediously by hand. In our home we have this mixer set up permanently right at the sink so that all Mrs. Smith has to do is turn the switch. It does the rest. Now let me show you a few of the things it can do for you to save your time and fingers and even improve cooking in many cases."

MRS. BROWN: "Yes, I'd like to see how it works. A friend of mine has one, but she seldom uses it. I've wondered why."

¶ Still the fear that it will be bothersome remains, and Bill meets it by demonstrating the real ease of operating it and, more important, cleaning up afterwards.

BILL: "I'm afraid your friend hasn't been shown how convenient an electric mixer really can be. Now here is the basic unit—the strong muscles and fingers to do your work for you. Many times, no doubt you've thought of making some delicacy, such as ice box cookies, or divinity fudge, but have given up the idea because it took so long to beat and stir and it was such a hard job. And yet to this little motor it is all in a day's work. This does all the tedious work of beating batters. It even mashes potatoes to a creamy consistency. With this device you can make your own mayonnaise and salad dressings, fresh, and spiced just to your own taste, and really save enough on this item almost to pay for the mixer in time. It will even make mayonnaise while you attend to other things. You simply put in the ingredients and let it go."

MRS. BROWN: "That is something, all right. I don't know that we'd have much use for the juice extractor though."

BILL: "You know, that's an interesting thing. We did not seem to care for orange juice before, either. Really it was such a hard job to squeeze all the oranges. But now, having it handy, it's no trick at all. And surprisingly, we get almost twice as much juice out of each orange than we got before. Now orange juice is a regular daily treat. And take milk drinks, you know, malted milk and these chocolate drinks that are advertised and used so much these days. You know how hard it is to get them thoroughly mixed. Now the children can mix them themselves on this machine, and they like doing it. In fact, you'll find growing youngsters will be more willing to help you with your

kitchen tasks when they can have such a handy tool to help them."

MRS. BROWN: "That certainly sounds good to me. But how about cleaning up these things after you use them?"

BILL: "I'm glad you brought that up, Mrs. Brown, because really that is a big advantage. When your mixer is set up at your sink, you just take these appliances off—see how easy it is—and rinse them under the hot water. In most cases just let them dry themselves, or if you prefer, wipe them off. The parts are all made of porcelain or stainless metal and will not rust. They ought to last a lifetime."

MRS. BROWN: "That's fine. But what are these other things? I've heard you can shred and grind food. Is that so?"

BILL: *(Laughing.)* "I should say so. You know yourself, Mrs. Brown, that the old fashioned hand graters and shredders are positively dangerous. I know many women who have shredded their fingers instead of the carrots. I'd hesitate to use one myself. Now with this shredding attachment there is no way to get hurt. See the machine protects you and still does a better job of shredding. It is the same way with a food grinder. See how you are protected here, and yet you can grind difficult things too, without a bit of tussling. It is economical, too. Take meat, for example. It always keeps better in a solid piece, you know, and with this you can grind it fresh just when you need it."

MRS. BROWN: "That is true. But wouldn't it cost a great deal to get all of these things?"

BILL: "That is the surprising part about this mixer, Mrs. Brown. It is absolutely unique in that respect. You can start to save your time and your energy with this main unit here, which comes with bowls, mixers, and fruit juice extractor, and then you can add to it from time to time, just as you require. Should you want a shredder before getting the pea sheller, for instance, or the potato peeler, you can get it for just a few dollars. And there is one thing sure, the manufacturer is on the alert to bring out new devices that will fit on this mixer and that can be useful to you in many other ways."

¶ Bill decides now to close the sale, so he illustrates the need for the mixer in a dramatic comparison and sums up the things that the mixer will do for his customer.

BILL: "You know, Mrs. Brown, this is the way I regard a mixing machine as versatile and useful as this one. For centuries we have used tools to eat with, because it is more sanitary, and it looks better. Men use tools in their work. If your husband works in an office he uses typewriters and office machines; if in a shop he uses various tools. You probably use a number of tools in caring for your house—a broom, a vacuum cleaner, a washer perhaps. Now, preparing food was the only operation still done largely by hand until these handy and husky little mixing machines came along. Why, even the big commercial food factories have had these on a large scale for years so that they could truly say that their products were untouched by human hands. Now even the tedious jobs, like peeling apples and potatoes, shredding food, grinding, shelling peas and many others are done quickly in your own kitchen with this modern, efficient little kitchen helper. Suppose I bring one out to your house and set it up in a really convenient place for you so that you can start right away to enjoy the help it will give you in your kitchen?"

¶ Notice that Bill has bridged one of the biggest resistances by offering to set it up in her kitchen in such a way that it will work satisfactorily from the beginning. This is a point every wise dealer will take from Bill, for see how it closed the sale.

MRS. BROWN: "If you'll set it up like that for me, I'll take it, for I don't know much about electricity and I wouldn't know just where to connect it."

BILL: "I like to do that for my customers, Mrs. Brown. After all, that is MY business, isn't it, and I know that if it is properly installed so that you can use it every minute conveniently, you will think it is the best investment you ever made and be glad to recommend it—and me—to your friends."

¶ Bill also knows that if he brings the mixer to her home and sets it up he will have an opportunity to learn what other electrical appliances she lacks so as to sell them to her later.

MADE IN U.S.A.

CALIFORNIA OREGON POWER CO. | PORTLAND GENERAL ELECTRIC CO.
MOUNTAIN STATES POWER CO. | PUGET SOUND POWER & LIGHT CO.
PACIFIC POWER & LIGHT CO. | IDAHO POWER COMPANY
NORTHWESTERN ELECTRIC CO. | WASHINGTON WATER POWER CO.
★ UTAH POWER & LIGHT COMPANY ★

DEPENDABILITY FOR LIGHTS THAT MUST NOT FAIL

THIRTY YEARS of unusual performance of **American Steel & Wire Company High Voltage, Non-Leaded Submarine Cables—Amarine Insulated**—form the background that warrants the selection of Composite Control and Power Cables of our manufacture for this exacting service. Hundreds of installations have demonstrated the merits of this cable—its light weight, ease of installation in continuous lengths up to 24,000 feet and freedom from trouble due to sheath failures and the like. Many have acclaimed the economies which result because damaged cable may be repaired with minimum replacement—frequently only a splice at the point of failure. Perhaps your problems would be better solved with this cable. Our engineers are ready to explain its features to you.

AMERICAN STEEL & WIRE COMPANY

United States Steel Corporation Subsidiary

Pacific Coast Distributors

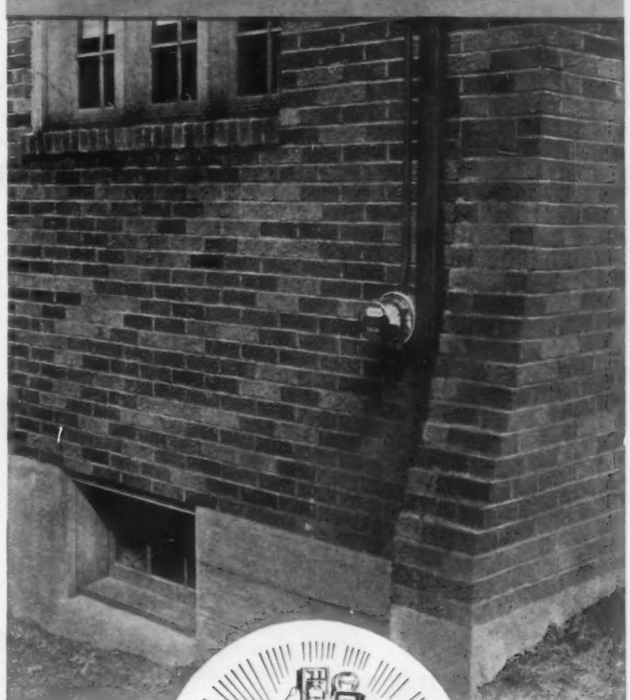
COLUMBIA STEEL COMPANY

SAN FRANCISCO LOS ANGELES PORTLAND SEATTLE

TODAY'S METERING REQUIREMENTS INDOORS OR OUTDOORS

demand

DETACHABLE METERS



● The basic requirements for metering to-day are: (1) Enclosed wiring; (2) Interchangeability for indoor and outdoor installations; (3) Low installation cost; (4) Low operation and maintenance; (5) Protection against energy diversion; and (6) Full registration of all loads.

Only detachable metering—and the Westinghouse CS Detachable Meter in particular—assures the most successful and economical answer to these six basic meter requirements.

1 Detachable metering is designed specifically for enclosed wiring—indoors or outdoors.

2 Detachable metering is truly interchangeable. *Only one type of housing* is needed for any installation . . . for any make of meter . . . indoors or outdoors. No additional enclosures, test facilities or other auxiliary devices are required.

3 Low-cost installation is synonymous with detachable metering. To install, just plug the meter into its socket like a radio tube. *There are no connections to make or disturb.*

4 Once installed—A *CS detachable meter* can be practically forgotten except for reading. Even the bearing at the bottom of the moving element needs no periodic inspection or replacement.

5 Since the socket of the detachable meter is mounted directly in conduit, and the meter element *allows full visual inspection,* there is little possibility of tampering—indoors or outdoors—without leaving readily-detected, tell-tale evidence.

6 The *CS detachable meter* assures straight-line accuracy up to 300 per cent rating regardless of location or weather conditions.

R 57027

SINCE 1888

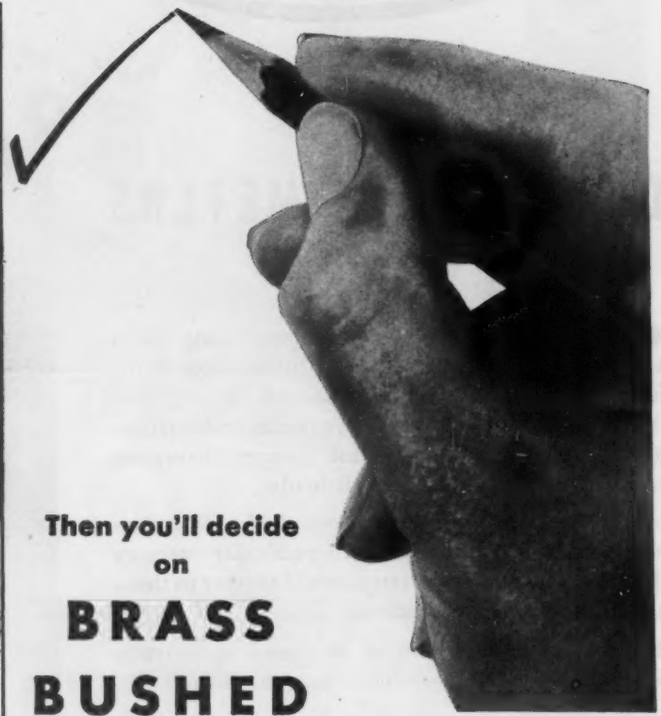
METERS INSTRUMENTS RELAYS

Westinghouse

Check these features

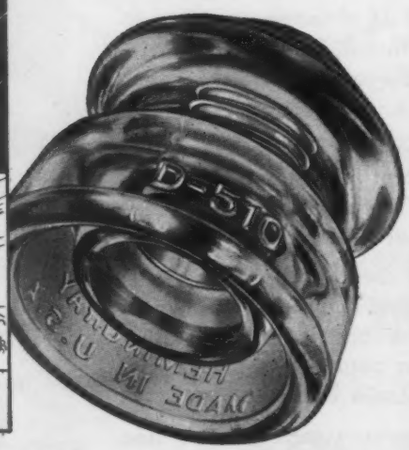
O-N-E BY O-N-E

Brass bushed smooth threads for insulator pin.
Greater mechanical strength.
Sustained dielectric strength.
Unaffected by sudden temperature changes.
Withstand maximum insulator pin expansion.
YES, SIR, THEY'RE O.K.
Never age or deteriorate.
Controlled uniformity of product.
All surfaces impervious to moisture.
Tougher—withstand rough handling.
Clear and flawless for easy inspection.



Then you'll decide on

BRASS BUSHED Hemingray Insulators



● Greater proven economy and reliability than ever before! The brass bushing relieves strain of pin expansion, gives added mechanical strength and insures uniform contact with pin. All styles made in clear and brown color. Ratings up to 15,000 volts. Write for samples. Owens-Illinois Glass Company, Hemingray Division, Muncie, Indiana.

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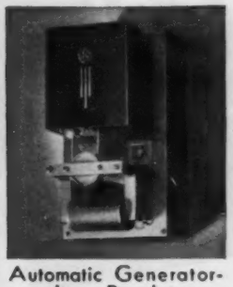
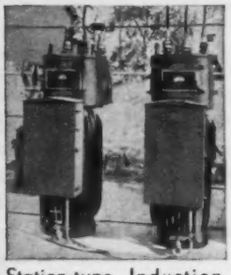
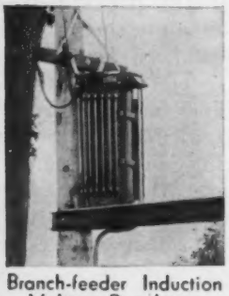
HEMINGRAY INSULATORS

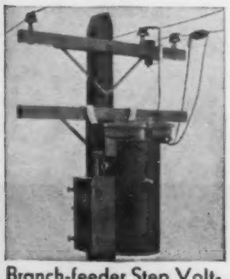
For *Profitable* Voltage Regulation

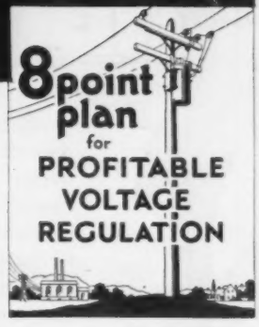
The 8-POINT PLAN
Offers New and Improved Equipment for the Solution of Every Voltage-regulation Problem.


Automatic Generator-voltage Regulators


Station-type Induction Voltage Regulators


Branch-feeder Induction Voltage Regulators


Branch-feeder Step Voltage Regulators



THE 8-POINT PLAN offers an opportunity to improve voltage at a profit by providing equipment for economical regulation at every vital point on the power-company system.

The problem of voltage regulation is today of major importance. It has been made increasingly complex by the addition and extension of urban and rural branch feeders and the increasing load in all areas. Individual feeder induction regulators at your substations do a good job and are fully adequate for feeders confined to medium- and high-load-density areas. Branch-feeder regulators supplement substation regulation in the light-load-density sections at a cost consistent with revenue.

The General Electric Company has developed a comprehensive line of voltage-regulating devices to meet these problems. They are presented in the 8-POINT PLAN.

Let us point out to you how sound economics dictates the use of the equipment offered by the 8-POINT PLAN. Send for a folder giving complete economic and application information. Simply address the nearest G-E sales office or General Electric, Dept. 61-201, Schenectady, N. Y.

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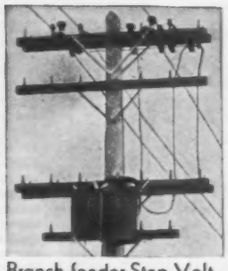
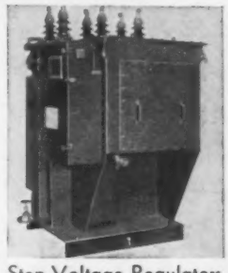
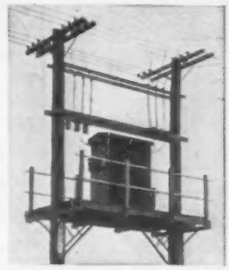

Branch-feeder Step Voltage Boosters


Step Voltage Regulators for Higher Voltages


Series Capacitors for Reducing Lamp Flicker

Autotransformers for Reducing Lamp Flicker

GENERAL ELECTRIC

Outside meter cases of Alcoa Aluminum last longer, and look better throughout their life, because Nature made Aluminum so highly resistant to atmospheric corrosion. Nature also made Aluminum light, which facilitates the handling of cases made of it.

These cases of Alcoa Aluminum need no surface protection. There will be no cost of painting or repainting.

The natural silvery grey is inconspicuous. And the same natural color persists through the year-by-year cycles of heat and cold, of snow, sunshine, and rain.

Alcoa Aluminum cannot rust, and it will not stain walls or other adjacent surfaces.

The die-cast type of box has been adopted by many utilities. Necessary fittings, bosses, and lugs are cast integrally with great accuracy of dimensions. Identifying inscriptions, marks, and instructions are reproduced in finest detail. Many refinements in general shape and form, to achieve pleasing appearance, are possible by this method of fabrication.

Boxes pressed from Alcoa Aluminum sheet meet the frequent need for small quantities to special specifications.

Your inquiry directed to the several manufacturers now supplying outside meter cases of Alcoa Aluminum will disclose reasonable first cost. The long life expectancy makes these boxes a real economy.

ALUMINUM COMPANY OF AMERICA
1832 Gulf Building, Pittsburgh, Pa.

ALCOA ALUMINUM

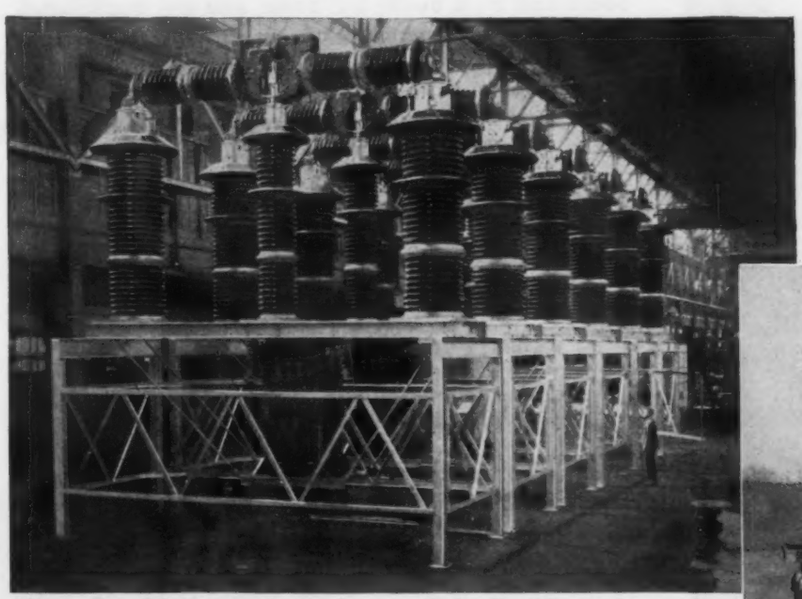
Not only circuit breakers but RECORD BREAKERS

Here's Why IMPULSE BREAKERS Have Won this Distinction

1. **They are built for the highest commercial voltage—287,500 volts**
2. **They operate at the highest speed—0.04 or 0.05 second**
3. **They have the lowest oil content—only 1/10 of the usual amount**

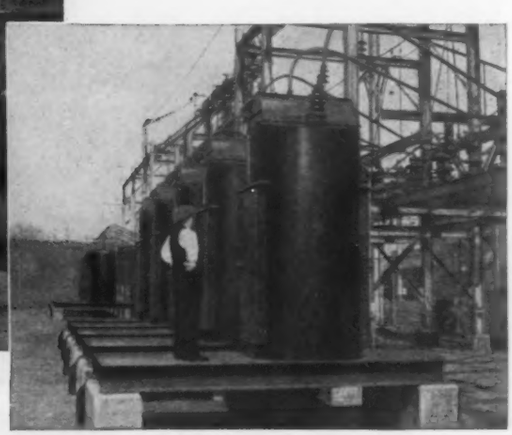
TWELVE impulse breakers are being built for the Bureau of Power and Light of the City of Los Angeles for the control and protection of the Boulder Dam—Los Angeles transmission lines. Eight will operate at 287.5 kv.—higher than any operating voltage now in use. Four will operate at 138 kv. Both have a rated operating time of three cycles (60-cycle basis) as compared with eight cycles, the fastest heretofore for high-voltage breakers of the usual type. They will improve system stability, and their exceptionally low oil content solved the complicated problem of maintenance and inspection which their installation at remote desert points presented.

Impulse breakers already have an enviable record in railway service, operating at 11,000 volts on the Reading Railway. Many are in service on the Pennsylvania's electrified line between New York and Washington, protecting the 11,000-volt trolleys.



Above—Type FG-30, 287.5-kv. impulse breakers assembled at the Philadelphia Works of the General Electric Co.

A reprint of an A.I.E.E. paper by D. C Prince, which gives a complete technical description of the circuit breakers for Boulder Dam, is available on request. Address the nearest G-E office, or General Electric, Dept. 6C-201, Schenectady, N. Y. Ask for GEA-2121.



Right—Ten FG-2, 15-kv. impulse breakers installed at the Baltimore substation of the Pennsylvania Railroad

860-3

GENERAL ELECTRIC

New...

Not a Compromise but a Real Regulator

for 2400 to 13,200 Volt Rural Lines at Low Cost

● The Allis-Chalmers Type AFR regulator opened up possibilities for regulating 6900 and higher voltage feeders and introduced new economies in regulating 2400 volt urban feeders.

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● Flexibility in application is provided so the unit can operate between 10% boost and 0% boost; 7½% boost and 2½% buck; 5% boost and 5% buck; 2½% boost and 7½% buck; 0% boost and 10% buck.

● It is responsive to voltage conditions. For its vital parts it employs tried and proven elements of the Type AFR regulator.

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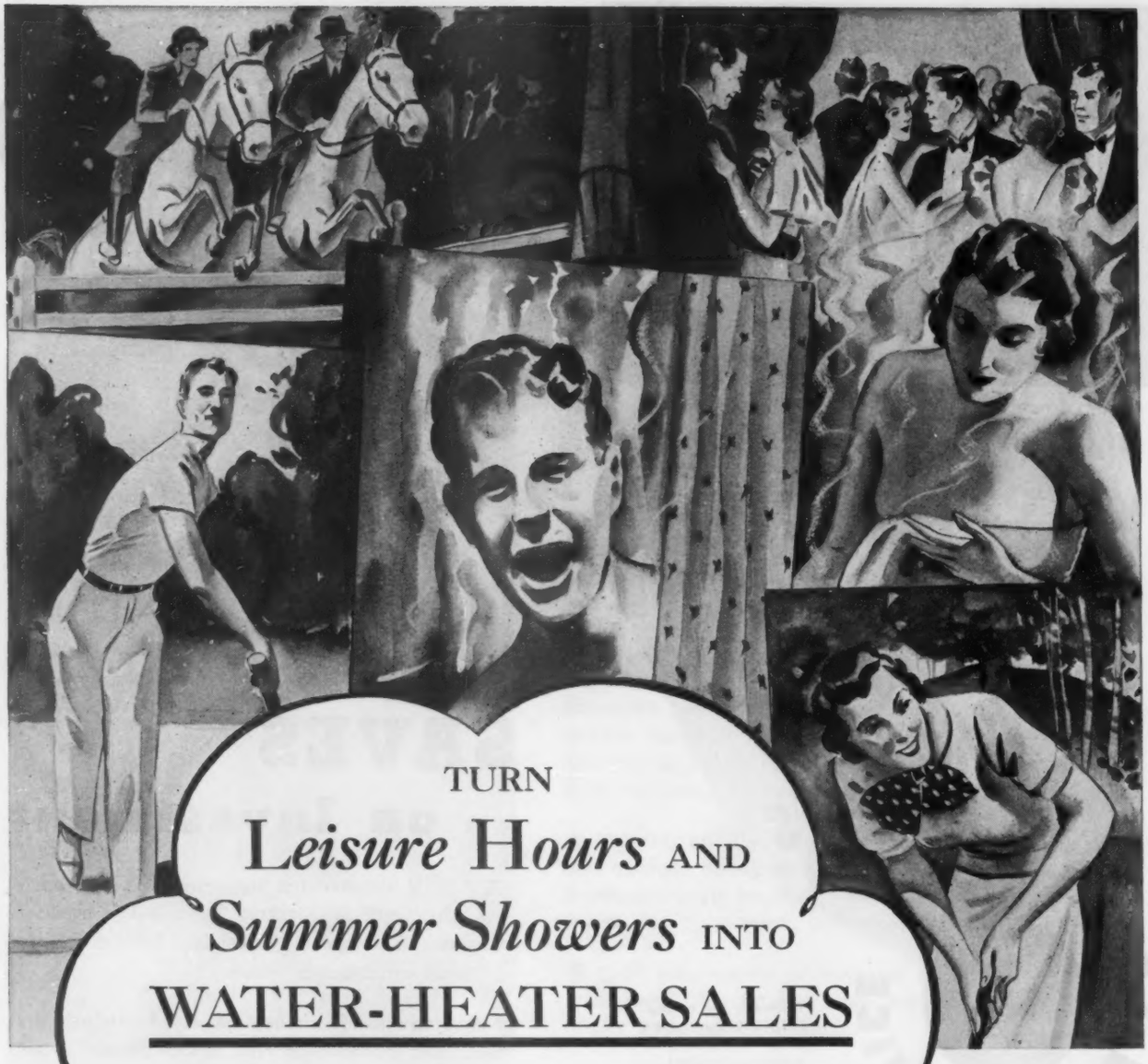

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SUMMERTIME is shower-bath time. After work or play your customers know that the universal fatigue-chaser and builder-upper is A SHOWER-BATH.

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Monel Metal is a registered trade-mark applied to an alloy containing approximately two-thirds Nickel and one-third copper. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

Another hot item right now is the new HOTPOINT Automatic Electric Range —"Mayfair"—styled by Helen Hughes Dulaney. Mayfair has a table top of MONEL METAL which can never rust, chip, crack or peel . . . which will neither wear off nor wear out, that gleams like old silver and is so much easier to keep clean. This Mayfair model is also equipped with Hi-speed Calrod Heating Elements sheathed in INCONEL which permits more rapid heating yet gives longer service than any other heating unit.

ELECTRICAL WEST

[*Devoted to the economic production, transmission and distribution of electric power and its application to industry, commerce and the home in the Pacific Empire, and to the sale and distribution of electrical utilization devices, equipment and appliances in that area*]

July 1935

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"Little Man, What Now?"

ANOTHER experiment, "noble in purpose," came to an abrupt end on May 27, when the United States Supreme Court, by unanimous decision, returned a verdict against the National Recovery Administration in the Schechter case. With that decision, which set forth that delegation by congress to the President of power to approve codes was unconstitutional, came to an end the force of all the codes thus set up under the National Industrial Recovery Act. It dumped back into the lap of American business the exceedingly complicated and difficult problem of finding some way to live and let live.

Thirty days after that fundamental decision, the fog of confusion and bewilderment has not yet sufficiently cleared from the punch drunk leadership of code authorities and business associations to be able to forsee just what turn will be taken next. It is still as though Business had suddenly awakened to learn that its marriage to Cooperation had been illegal; that it had been living in sin. Its first reactions are those of any gentleman under the circumstances. Business has promised to do right by Cooperation, wages and hours, and fair trade practices, and probably means to do so. It still remains to be seen whether the chiseling practices which have already begun to be manifest, will permit the good intentions from being carried out. Or whether Uncle Sam will have to resort to a shotgun of national regulation to bring them together again.

The immediate consequences to business have been a whoop of new volume, as if with the brakes off, business recovery can go on by itself. This sign alone would give rise to a hasty opinion that business will be better off without restraint. Prohibition repeal had a similar effect for the first few months. But public notice is being given to certain depressant after effects to the spree of freedom. Even liquor interests evince concern lest the newly regained freedom be abused and set up reactions against it which may be more drastic than before. Business leaders seem to indicate a similar concern over fair trade practices, wage scales and hours. They are concerned that the progress toward fair business practices made under the duress of the codes shall remain voluntarily in force.

Whatever one may have thought of NRA and its codes, as a matter of governmental principle, there is no denying the reality that on the whole, small business was definitely better off with codes than it has been without them. Ignorance and hysteria had brought the small business to a total disregard for costs because its fears were all bound up in price. Therefore, if the codes did no more than to redirect attention back to the *costs* of doing business, where it belongs, and away from *price*, a public service of considerable value has been served by the "experiment."

Certain gains were made for the betterment of the electrical industry in the West as a result of code activity. Associations in each branch of the industry, which had lost heavily of their memberships and consequently were relatively ineffectual in their programs, were revived immediately. Today that membership is the largest in history.

Since it will be very much in the hands of such associations as to what can be salvaged and made to supplant the NRA codes, ELECTRICAL WEST has made a quick survey of these various associations. As yet their plans, with few exceptions, are vague. Most of them are groping a bit, to find just what is still floating and what is unsafe to rely upon. Although congress has passed a new NRA act of one year's duration, no one seriously considers this as anything more than a paper organization, without particular power or value. It appears on the surface more as a means of keeping a portion of the NRA staff from sudden dumping upon an already large unemployment list.

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• MANUFACTURERS were addressed by Frank C. Jones, president of N.E.M.A. in a strong message urging adherance to the principles and wages of the manufacturers' code, although he gave tacit agreement to a lengthening of hours from the code limits of 36 to the more generally adopted 40 hrs. The electrical manufacturing code was one of the only codes providing for the 36 hr. week. He urged further that the statistical reports which have benefited both employers and employees be continued. These will be handled by N.E.M.A. instead of by the code authority. He also urged that until some legislation is devised to preserve some of the basic principles of the N.I.R.A., that manufacturers adhere voluntarily to the provisions of the manufacturers' code.

First organized group of manufacturers agents in the West has been the Ben Franklin Club, recently organized in Los Angeles. Its June 18th meet-

ing, according to Graham Holabird, secretary, passed a resolution endorsing the government's request that business adhere to the principles of its codes and pledging each member of the club to see that "the present improved conditions in the electrical industry be continued uninterruptedly."

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• WHOLESALERS are better prepared to function and more alert to their opportunities than any other group in the industry. Just before NIRA was even discussed, through the National Electrical Wholesalers Assn., a code of fair trade practices had been submitted, heard, and approved by the Federal Trade Commission. This was officially approved Oct. 14, 1932, and preliminary steps had been taken to set it in operation when NIRA was brought forth.

With NRA as "dead as the dodo," the Pacific Division, N.E.W.A., at its meeting in Del Monte in June, reaffirmed these Federal Trade Commission rules (many of which are stronger in their implication than the electrical wholesalers code as it finally emerged from NRA) and have converted the code commission organization into this new function. Violations of these fair trade rules will be treated as subject for legal action before the Federal Trade Commission. The commissioners appointed in each section of the country will operate this new plan.

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• RADIO WHOLESALERS, according to Al H. Meyer, one of the code authority members for that industry, plan to strengthen the association and to seek to obtain better regulation of the business of radio wholesaling through a strong association.

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• CONTRACTORS, too, had had approved Fair Trade Practice rules from the Federal Trade Commission, and among the leaders there is some wonder whether, now that a method of handling such rules has been evolved, these can not be put to real use. One trouble with contracting is its intensely local nature; likewise its individualistic ownership and the large number of small volume businesses in the industry. Only something with the "teeth" which NRA provided wherever the contractors took the trouble and leadership to make their code work, seems to have the vigor and the authority which seems to be needed to govern this business and save it from its own weaknesses. The code was not a success everywhere, but of all the construction industry groups the electrical contractors did more to better their business with their code than any of their associated crafts.

One thing the codes did for the electrical contractors which may prove a key to many of their future problems; it definitely placed electrical contracting in the construction industry. It is only natural therefore, that solutions of its problem now should be sought together with other groups in the construction industry.

An unusually strong and comprehensive local plan is being evolved in San Francisco. Leadership in the plan is coming from the construction industry conference, a group of association and code authority executives who first met to coordinate their respective codes under the construction industry. Charles A. Langlais is prominent in this new plan.

The proposed plan, subject to some revision and adjustment to meet the best interests of all parties involved, is being worked out jointly between the general contractors, the sub-contractors and specialty contractors, the Industrial Association, representing finance and the public interest, and by the unions. It proposes the joint selection of a "Building Trades Enforcement and Control Board" consisting of three outstanding citizens, not in any respect connected with the construction business, who shall sit as a final board of appeal and arbitration to hear cases of violation of wages and hours and basic fair trade practices such as bid peddling. Failure to heed the order of such a board to cease and desist would bring about a sanctioned strike on the job of the violator and deny him the use of the central bid depository. The latter would be given much more strategic importance by being accepted by architects and general contractors as the sole clearing house for the reception of bids.

It is estimated that the operation of such a system will require but a small portion of the former code fees paid by all the crafts to their individual code authorities. The proposed program has the big advantage that it is entirely local in its ambitions and hence more easily operated and adjusted to situations as they arise.

Oakland electrical contractors, on the other hand, plan to concentrate upon a smaller association membership, abandon filing of separate duplicate bids, and merely register intention to bid with their local office.

Southern California electrical contractors, operating under the Biddle Trade Bureau, are taking steps to organize for operation within the provisions of laws applicable to intra-state business. This trade association bureau has been particularly successful in the operation of associations in strict conformity with anti-trust laws and yet providing the necessary regulation of business practices which is necessary to profitable business.

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• RETAILERS in electrical appliances are affected in common with all other retailers. Everywhere leaders in retail business are urging maintenance of NRA hours and wages. Of fair trade practices retailers had but one that meant anything, and that prohibited "loss leaders." When NRA was declared unconstitutional it took about two editions of the dailies, only, before advertising began to reveal price cutting and a return of loss leaders among the cut rate, large volume stores. It will be in the retail field that the small business will suffer most from the loss of NRA.

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• UTILITIES will be least affected by the decision than any other group. Wages and hours with them have been generally above the requirements of the code. As monopolies they have already been regulated and will continue to be regulated, if anything more than in the past. NRA failed in an important particular to mean much to private utilities. Municipals refused to play ball and hence the one source of unfair trade practice was denied any help from government. On the other hand utilities did feel the effect of codes on those businesses with whom the utilities did business. Prices of materials and services from them were higher. Politics on the other hand demanded lower rates from the utilities. So they felt the squeeze both ways. They could not be blamed for a luke-warm attitude toward NRA.

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WHAT NOW?

• THAT, at press time, was the situation with respect to the codes. New developments may be expected in any quarter. If business continues to show improvement, it will be concluded that no NRA is needed, that at least, to be charitable, it served its purpose in a dark hour when business touched bottom and returned to a critical analysis of what was required to restore it to health—namely, a realization of cost and profit and operation under sane ethical standards. If, on the other hand, the spurt proves to be temporary and the old chiseling and below-cost selling returns, the capitalistic system, which needs not only *cost* but *profit* to survive, will seek its salvation by a demand for some form of federal regulation of business practices. The taste of the codes to business, though bitter to some, was too sweet to surmise that a regular diet of it may not be demanded in the future, human nature being what it is.

+ + + by Electra's Husband

Small Town Stuff

THE phone just rang and some sweet young thing asked: "Good morning. Just a year ago your friend J— D— was married and you sent him a telegram. I know he'd like to receive another telegram from you on his first anniversary, tomorrow. Do you want to send one?"

I did.

That's smart promotion. Not only sales promotion, but what utilities call public relations promotion, because I am grateful to the telegraph company for remembering what I had forgotten —and for remembering that I am a customer. The point is, power companies could well afford to follow their customers through routine, run-of-the-mill business (such as credit and complaint matters) in order to add a touch of humanness to the contact. For instance, suppose a customer's credit has been impaired through inability to pay his bills on time, and he had received several of the routine collection letters. This is common—or was. And then the customer gets a job or sells a crop or inherits a fortune—anyway, he again is able to pay on time. Some executive (and not some clerk) should write the customer a letter, saying in effect:

"We're mighty happy to see that you're back on your feet again. And just because you're paying your bills promptly, don't think we're going to forget you. You're been fair and honest, and we appreciate it. I hope it doesn't happen again, but if you ever find it hard to meet your obligations promptly, remember that my office door is always open to you."

That being "small town stuff," it may seem silly and unbusinesslike, but it gets the "x" in the right place.

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SMALL towns deserve more attention from utilities anyway. Instead of worrying about what the cities are going to do, they should devote their worrying moments to what the small towns are doing.

Two years ago, then-P.C.E.A. President R. E. Fisher wrote that municipal ownership is like an eczema: it must be stamped out at first appearance lest it spread. The first appearance of municipal ownership agitation is in small towns, because small towns are so easily organized, so the best strategy certainly is to fight and win the small-town skirmishes. The victories of the M.O. agitators in small towns gives them the training and the courage to force a major fight in a large city.

True, the power companies have been defending themselves, but they have lost because they have violated many military principles. Like General Braddock, they forget that tactics should vary according to the battlefield. For example, you can't even change cigarette brands secretly in a small town, much less hide your identity. So to form a "Citizens' Committee" or persuade a civic group to front for the utility is worse than ineffectual; it is downright harmful because it clothes the utility with suspicion. The voters rationalize that if the utility is afraid to fight its own battle, it must have a weak case.

In case you don't know, the agitators work in pairs, one to make a stirring speech against power company "domination" and the other to tell how the situation can be remedied by municipal ownership. To any direct question, their answers are vague, often misleading, sometimes untrue, but the answers go unchallenged.

The time to attack the attackers is when they are most vulnerable, i.e., when they are on the speaking platform. So why don't the power companies organize groups of minute men —men who know the utility business and can answer most of the complaints, who are at least familiar with public speaking, mob psychology and parliamentary rules—and send one or several of these men to every mass meeting the agitators call? Then, when each meeting is well under way, the minute man can ask a few simple questions, make a few pointed remarks and put the fear of Truth in certain breasts.

Of course, there will be some nice fights, but the newspaper stories, instead of telling only what the agitators said, will point out the fact that the power company representative asked questions and made charges. As it is now, the public reads the stories, studies the false doctrines, finds no power company answer, and concludes that the agitators are right. One of the saddest features of the present situation is this: the power companies are not giving their friends much ammunition with which to help fight.

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BRAINSTORMS are supposed to appear in another section of the book. However Electra will have to forego the two pairs of stockings that the $2.50 might buy because this particular brainstorm might not be deemed worthy by the editorial censors. However, here it is:

If I were a utility sales manager, I would personally and thoroughly investigate every industrial plant in my territory which operates its own generating plant. Many of these industries are now expanding after long periods of curtailment or complete shutdown. Chances are that their boilers and generating equipment have depreciated until maintenance expenses are unreasonable. Sawmills find themselves short of fuel and the prospect of burning oil under boilers designed for sawdust is not pleasant.

Many of these plants have standby contracts with utilities, but the rates and terms of these contracts may not be designed for the present situation. The supply lines may even be inadequate. Most of these plants have loads large enough to warrant careful and persistent selling effort.

This wouldn't be mentioned at all except that an industrial engineer brought the subject up for discussion. Electra's comment was, "What do you know about engineering?"

Business Development Problems + + +

[*More of the prize winning problem paper answers in the Pacific Coast Electrical Association Contest*]

Give a Little More Than Is Expected

By J. A. CORLETT
General Electric Co., Los Angeles

GOOD will is an intangible asset of eminent material value. If it were possible to buy good will, no company desirous of increasing its custom could do better than to exchange its money for this elusive but valuable asset. As a bridge is fabricated from a multitude of smaller parts, good will is created by gradual means. Of the various factors going into the creation of good will, courtesy can well form an effective keystone.

Courtesy may be defined as a sincere regard for the feelings and rights of others. Courtesy is not negative. It does not imply agreement with all of the opinions of others, but it seldom encourages argument. Courtesy, the hallmark of character, will go a long way toward developing permanent good will.

Consider the case of an irritated and antagonized customer calling at the office of his electric utility company. Although the normal treatment of visitors by the man who receives him may be considered courteous, normal treatment of this caller will not make a favorable impression; a fine discernment of the best course of action under the existing condition is required. In some manner the caller's viewpoint must be obtained and without asking a dozen questions which to him seem foolish. Only by being genuinely interested, which is being really courteous, can this viewpoint be exposed. By getting at the roots of resentment, they can be pulled from most soils.

An effective way of increasing good will is to give just a little more than is expected. At one time a standard practice of the clothing merchant was to "throw in" a belt or pair of suspenders after the suit had been selected. No earlier than the beginning of the last decade, the baker gave thirteen rolls when a dozen was ordered. Everyone reacts pleasantly when getting more than is expected. But today, should an organization "throw in" a belt, competition would throw in a belt and a pair of garters. However, throwing in courtesy will not upset price or profit schedules. Give more than is expected of this much appreciated but inexpensive bonus and watch the barometer of good will climb.

Telephone Manners

Every telephone call received bears an opportunity for increasing good will. It is a contact initiated by the customer or prospect. Bearing in mind the great pains and expense involved in obtaining personal contacts with customers and prospects, is full appreciation accorded the favor that has been done the organization when a customer or prospect telephones? A cold, gruff, or indifferent voice does not furnish the sort of ground in which opportunity may be expected to flourish. Every call warrants a friendly manner, a display of interest and close attention. If a personal call were being made by a representative of the organization upon the party that has telephoned, every effort would be made to make a good impression, to be friendly and interested in his problem. When the customer or prospect initiates a telephone contact, he deserves even greater attention than if making a personal visit. When a telephone call is received the individual taking it must assume the responsibilities of host just as definitely and completely as though the person telephoning was actually arriving in the office.

Could clerks, engineers, and salesmen who handle telephone calls be given an opportunity to hear their own voices over the radio, the efficaciousness of telephone communication and the satisfaction derived from it would be enhanced. In telephone conversation contact is no more direct than that of the radio speaker with his listener. Let the people who handle telephone business note the careful timing, clear enunciation, and the regulated pitch of a good radio voice. When customers understand, there is gain in efficiency as well as good will.

Asking customers to wait on the line while a bill is located or a file obtained is hazardous for often the delays are longer than expected. Calling back is safer when any chance for considerable delay exists. If the customer insists on waiting a few words spoken to him from time to time will minimize the annoyance of waiting. Telephone operators will please such parties as must wait for their connections by informing them at short intervals as to the progress of their calls. In the transfer of calls from one department to another great care should be taken that the customer is not required to tell his story more than once.

Highly efficient telephone service is vital to good will.

When Taking the Money

When a man spends his money he likes to know the men to whom it goes. Most men know at least one representative of the store from which they buy their suits, most men know several butchers, several grocerymen, several automobile service men. How many men know a representative of the office to which they pay their electric bill—that is, men who are domestic customers only? The manager of many a neighborhood movie theatre stands in the lobby of his theatre bowing and smiling to as many of his patrons as will look at him. Few cashiers have developed a reputation for hospitality. Sometimes they thank the customer, fewer times do they smile, seldom show any interest. Of all the people who should be pleasant, it should be the person who is with us through that dark moment of giving up our money. There are department stores where the sales people are so genuinely interested in their customers that the unpleasantness of paying is transformed almost to pleasure. In this merchandising field many examples of ef-

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Public Relations

Second prize winning paper on the best answer to the problem: "What are the Most Effective Methods of Increasing Customer Goodwill."

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fectively pleasant customer contacts can be found.

For the domestic customers who pay by check, a method of personal contact should be devised. Every customer should know some specific person in the electric company who is interested in having this customer's electric service just exactly right. If this specific person can show one of his clientel how to save a few cents on his electric bill, the electric companies good will experiences an upturn. It will put the customer into the right mood for listening to ways of saving more money by purchasing more kilowatt hours. The public is sold on the idea of using electricity for light, for refrigeration, for cooking and for heating and air conditioning. They are not properly informed on the cost of doing these things. The common idea is that the electric bill will be completely out of sight. This specific person whose name is known by each customer in his particular territory should not be known as a salesman, but as an encyclopedia on domestic electrical service.

Employees Confidence

Important to the good will of any company is the loyalty of its employees to the organization. Certain results of depression, such as salary reduction, position lowering and shortening of force have in some cases caused employees to feel adversely toward their employers. This adverse feeling can be effectively offset by building in the heart of each employee a confidence that he is an essential and desired part of the organization rather than just another unit capable of easy replacement. An ambitious young man once called upon Henry Ford to sell him a piece of real estate. After listening for a few minutes, Mr. Ford picked up a small piece of fiberous material from his desk and tossed it to the salesman. The salesman could not answer Mr. Ford's question as to what the material might be. For fifteen minutes Mr. Ford talked about this material and also most frankly about his plans for next year's model. He then told the pleased but puzzled salesman that he did not care to buy the property. By taking this young man into his confidence, Mr. Ford assured him of his own merit and sent him away happy in spite of a decisive refusal of the proposition. The effect of employees being taken into the confidence of their company will be one of reassurance of their own worth.

To create a company spirit and allegiance should be the aim of all organizations. Company spirit is encouraged by informal meetings and gatherings of a recreational nature. Opportunity is given the personnel of separated departments and divisions to become better acquainted. Annual outings, picnics, and athletic activities give good results in the development of company spirit. Until an allegiance is developed, employees are apt to feel that the company is a great machine incapable of human interest in its workers. By establishing the desired feeling between the employees and individuals of such position that they are virtually the company, so far as employees are concerned, the impersonal angle can be surmounted. Men will go to extremes of their ability in order to please a friend. Working beyond five o'clock, working at night, working on holidays is not drudgery or hardship when it is being done to help a friend. When friend Bill Jones telephones for service, he gets it at once and with a smile, but the service rendered stranger Doe won't be any more above normal than Mr. Doe insists upon it being. When the employees feel about those individuals who to them are the company as they feel about Bill Jones, everybody will get the best of service. The fostering of allegiance is always aided by that perpetual force of human nature—the instinct to best serve friends. Under these stimuli, employees will feel a new stability and will be able to see that the company actually has the best interests of its employed at heart.

This Paper Suggests—

Give a little extra courtesy,
Better telephone manners,
Restore employee confidence,
Good automobile manners,
Show that cost of delivering good service is more than mere generation,
An attitude which begets good-will.

Automobile Manners

An automobile bearing the company name is one division of the company's operations which is boldly exposed to public view. If some of the stock of goods is a bit dusty, if the boiler room needs a little paint, if the furniture in the accounting department is worn, if some of the contact people are just a little lacking in tact or courtesy or appearance—these facts are not apt to be broadcast to the general public. But an automobile carrying the company's name is under constant public observation. Consequently, it should be an example of safety, efficiency and courtesy. Such automobiles must be well maintained but not necessarily of the latest model. A two year old car well maintained, clean and polished may make an even better impression than a new one. When some branch of our municipal, county or state government comes out with an entirely new fleet of automobiles, the number of people who wonder if all the old cars were at that point beyond which continued operation would be inefficient is not few. These people wonder if their money that was collected as taxes was put to the best use. An equally large number of people wonder similarly when a private corporation makes what to them is an unnecessary display of prosperity. They say: "If this company was really trying to cooperate with us, it would use those cars a little longer and pass the saving on to us in the form of lower prices." A part of the automotive equipment of certain Los Angeles concerns holding enviable positions in the good graces of the public are not machines of the latest design, but are machines so carefully maintained that they appeal to the eye of all thrifty persons.

The discourteous driver of a machine bearing the company name is a far greater liability to the company's good will than a discourteous clerk or salesman because he does not know whom he is angering or antagonizing so has no way to right the wrong or correct the impression. To a company whose clientel is but a minute fraction of the community, the harm done by a discourteous driver may be negligible. To a company whose clientel includes a large fraction of the community, the effect may be really serious. Most of our traffic officers when patroling streets and highways are models of courtesy, rigidly observing regulations and extending every consideration to pedestrians. For the benefit of the good will of their owners, let company owned automobiles emulate the example of these officers.

Tell Them About Delivery

Many people have learned that electrical energy can be produced at a cost of a fraction of a cent per kilowatt hour, but the facts concerning the rate at which this production must go on to obtain so low a cost have not been thoroughly remembered. This multitude has no appreciation of the cost of transmission lines with their miles of copper and tons of steel, of distribution systems with their closely meshed net of serving lines. As a result, it is commonly felt that in each domestic bill is included an excessive profit. In

contrast, there is a common feeling of wonder at the fact that automobile manufacturers can produce such fine automobiles at prices so modest. This feeling is probably due to the fact that automobiles have improved so rapidly. An $800 car of today has more in the way of economy, speed, performance and comfort than the most costly car of ten years ago. Electrical facilities have undergone sweeping development in the same period, but the public is not much interested. Automobiles are thought of in terms of pleasure, electricity in terms little better than any other household necessity. Through suitable advertising, link electricity with man's thoughts of pleasure and a new good will follows.

Why not let the people know that generation is not the tough problem in serving homes with electricity but that delivery is the hard part. Let the people know the relative weight of these two factors from the standpoint of investment and from the standpoint of future development. Let the people know about taxes. By educating the public as to the cost of maintaining in the home an ever present reliable source of electricity, as to the cost of small quantity deliveries of electrical energy and that public will say as it has said of the automobile industry—"How do they give so much for so little"? The profits of the development of such a sentiment would properly be credited to the account of good will.

In courting the elusive asset of good will, give a little more than is expected in consideration and courtesy. Recognize the opportunity present in telephone calls and fill in the short-comings of telephone service. Develop a more intimate customer contact. Convince employees that the company has their best interests at heart by restoring employees confidence. Let the appearance and handling of company automobiles be such as to publicly reflect the high character of their owner. Correct the wrong impression that profits are excessive by giving the public a true conception of the cost of maintaining a reliable electric service ready to meet uncomplainingly the demands of emergency or normality. An attitude toward customers, employees and public which embodies these aims begets good will.

United Against a Common Foe

By ARTHUR H. HALLORAN

A CAUSE that would bring the electrical trade to cooperate with the power company is one which should not purposely be invoked. Yet, through circumstances over which the company has no control, this cause has developed. For the politician has finally emerged as an active competitor of all branches of the industry. Originally the politician, perhaps self-deluded, but nevertheless self-seeking and inimical to the public welfare, preyed only on the power company. His competition was merely a matter of academic interest to the electrical trade. But with the establishment of the TVA as an agency for wiring homes and selling electrical appliances, it and similar agencies are revealed as a common enemy to the electrical trade.

The politician makes his own rules for competition when he makes the laws. These rules are invariably unfair to those whom he seeks to destroy for his private gain. He does not risk his own capital, but that of a befooled public which awakes belatedly to his chicanery when the tax burden becomes too heavy to carry. Even the electrical trade is still partly under the influence of the stupifying drugs which he employs. It yet has to be aroused from its lethargy and armed to fight the foe which threatens its very existence. Only the power company fully understands the insidiousness of the "yard-stick" applied by the TVA and proposed for the Columbia River Authority, the California Central Valley project, and the various municipal undertakings to be aided by Federal moneys. So the power company is the logical leader in the campaign to be waged against this unfair competition.

Cooperation

Second prize winning answer to the problem, "What are the Most Effective Methods of Increasing Cooperation Within the Industry?"

The power companies in this territory have courageously assumed the task of absorbing the great power surpluses created by the Hetch-Hetchy and Colorado River developments. By rate reductions and by the financing of consumer purchases they are stimulating the sales of appliances to consume part of this surplus. Such action has provided a self-interest motive for the cooperation of the electrical trade in *sales* campaigns. But it will not be until the trade has been fully aroused to the political dangers which also threatens its self-existence, that the full measure of cooperation can be secured for building customer good-will.

Separation of Contractor-Dealer Functions

Analysis of previous attempts to solve this old problem in cooperation indicates that the fundamental cause of past failures was an inability to secure the whole-hearted participation of the contractor-dealer. The problem was once thought to have been solved when the latter was accorded the recognition which he demanded. Thereby it was hoped to "strengthen his morale, promote peace and harmony, and go a long way toward bigger and better business."*

Under this theory, the electrical manufacturers and wholesalers cooperated with the power company in teaching the contractor-dealers to become merchandisers of electrical appliances. But all to no avail. They were interested primarily in their contracting business and regarded merchandising as a side-line. Their consequent failures as merchants injured not only the individuals, but also the entire industry collectively.

Meanwhile, the furniture, hardware and department stores, and the exclusive electric specialty shops became the main outlets for home laundry equipment, vacuum cleaners, refrigerators, ranges and water-heaters. Their sales volume per month was greater than the contractor-dealer's sales per year. The mere fact that he provided a natural outlet did not make him a good merchant. Nor could the faithful old dog be taught new tricks.

So the first step in securing the cooperation of the electrical trade requires abandonment of the theory that the contractor-dealer can be made a volume outlet. Apparently a poor way to gain his cooperation! Yet when he understands the facts, especially as regards the cash he will *not* lose by abstaining from the large financial outlays essential to successful merchandising, he

*"Winning the Public," by S. M. Kennedy, 1920.

should be content to be a success as a contractor rather than a failure as a dealer. Nor should he object to the special sales effort which is put behind a real merchant in his community.

Concessions from the Power Company

The second step is complete realization that since "the utility is the party who seeks and needs the cooperation, it must be prepared to make the concessions."†

The power company needs cooperation, both in boosting the sale of appliances to consume its present power surplus, and in building public goodwill to alleviate the effects of the impending creation of vast competitive surpluses. This cooperation can be gained through a policy of trade conciliation and concession which includes a revision of the former concept of the power company's prerogatives in the industry. The immediate aims of the company should be subordinated to the ultimate welfare of the entire industry.

For instance, the electrical wholesalers are not satisfied with a power company's policy of warehousing electric ranges and selling them to dealers at prices which do not include handling costs and other differentials. Nor do retailers like a company policy of selling appliances to consumers. Free servicing and maintenance of consumer equipment has always been a sore point with contractors. These, and other practices, which might be cited, did space permit, the electrical trade regard as unfair competition. They should be eliminated if the company is to secure the wholehearted support of the trade.

Such elimination means that the company confine its domestic sales activities chiefly to the supply of electric current to the customers' meter, and delegate some of its other functions to the several branches of the electrical trade. It does not mean, however, that the company's domestic sales department be discontinued. Its efforts will be directed to the task of training more efficient merchants. Likewise the company's service personnel, when not busy on the company's lines, can be employed in training contractors to handle complaints due to faults in the consumer's equipment.

These recommendations require that the electrical trade act as the first line of company contact with the public. They call for the trade's active participation in the company's goodwill-building campaign. The training includes instruction in smoothing the frictions of consumer contact by means of the oil of courtesy.

†Ibid.

Accomplishment of the purpose requires but little change in the existing organizations. Let the Pacific Coast Electrical Association become a truly vertical organization, extending from the power companies through the manufacturers' representatives, the wholesalers, the contractors and the retailers to the consumer, insofar as the sale and servicing of appliances are concerned. This can readily be accomplished without disturbing the present horizontal associations of the several branches or the power company's contact with the consumer. The two major objectives of the P.C.E.A. would then become the maintenance of cooperation within the industry, and the creation of satisfaction to the consumer. The work can be done by two committees, each containing one representative from each branch of the industry.

This Paper Suggests—

An industry committee to formulate a code of ethics and promote its adherence,

Another industry committee on consumer satisfaction, to develop sales and goodwill and to work out the problem of service on consumers' equipment,

Separation of contracting from merchandising and material aid to both branches by the utilities,

Classes and schools to prepare the industry to sell more effectively,

That the industry unite against the common enemy —government in the electrical business—all of its branches being threatened.

Committee on Industry Cooperation

The first duty of this committee should be to formulate a Code of Ethics defining fair trade practices in intra-industry relationships. The general idea is exemplified by trade practice provisions such as: no retailing by wholesalers, no retailing or wholesaling of standard appliances by power companies, and no retailing and a minimum amount of wholesaling by manufacturers' representatives. It differs from the NRA codes in that compliance is entirely voluntary, in accordance with the individuals' self-interest. In drafting the code, due consideration should be given to the prerequisite of minimum investment and certain qualifications for would-be retailers, and possibly also for a contractor. The reason is too obvious to need discussion.

The committee's next duty should be to obtain a pledge of adherence to the Code from each member in the several branches of the industry. Such pledges should be predicated upon the hereinafter described benefits which will accrue to the individual as the result of a unified industry. The responsibility for securing them from each branch of the industry should be vested in the committee member who represents that branch.

The committee should function continuously as a coordinator of the differences in opinion which are sure to arise in the several branches, and as a promoter of peace and harmony throughout the industry. Its members should be ready to attend and address meetings, listen to complaints, and endeavor to adjust them. It should conduct a campaign of education to make all members of the trade understand that they cannot survive if they indulge in code-forbidden practices, and that each person is most prosperous when business is conducted ethically.

To this committee also should be deputized the all-important task of training the trade in the elements of courteous service to customers. In this respect it should collaborate with the personnel departments of the power companies and function through the agency selected to increase customer goodwill, as proposed in answers to a separate problem paper. This comprises one of the two main objectives to be attained through industry cooperation.

Committee on Consumer Satisfaction

The other main objective is to increase the use of electric current through the sale of current-consuming devices and through their continual use. This involves the creation of new customer-satisfaction by means of lightened labor or greater comfort and convenience, and its maintenance through the continued functioning of the purchased equipment. The trade is thus given its immediate reward for cooperating with the company. As this is the subject of other answer-papers, it is not yet possible to specify the detailed procedures, except to state that it can best be accomplished by means of a syndicated colorful magazine freely distributed to all consumers.

These procedures shall be made effective by the committee on consumer

satisfaction, a duty which is closely identified with those of the Pacific Coast Electrical Bureau. So it is suggested that the committee act in an advisory capacity to the Bureau and that the Bureau act as the committee's operative agency. The Bureau, in turn, should function through the companies' sales departments and other agencies which are promoting the sales of electrical appliances, and through the companies' service departments and other agencies concerned with maintaining equipment in operating condition.

The company sales department is an organization of trained sales specialists, proficient in sales promotion, cooperative merchandising, conduct of fairs and exhibits, house-to-house canvassing, selling in the store, and financing of purchases on the partial-payment plan, and who know home economics and the electrical products for taking the work out of housework. They, together with the sales specialists from the wholesalers and manufacturers, should constitute the teaching staff of a school of instruction for retailers.

This educational function should be undertaken without interfering with the sales department's equally important work in increasing the commercial, industrial and agricultural uses of electricity, a work which is beyond the retailers' province. But in performing this latter duty, the sales department should not compete unfairly with wholesalers and manufacturers, as may be defined in the code.

Instruction to small groups of retailers in each locality should cover all the essentials of successful merchandising; including business management, accounting, finance, demonstration of product and specialty selling. When conditions require, personal demonstrations should be made at a dealer's place of business, allowing him the proceeds from any sales thus made. Interest can be stimulated by awarding prizes to those who can make the best "presentation" after taking the course. No tuition fee should be charged, inasmuch as the purpose is to increase the sale of current-consuming appliances, thus redounding to the benefit of the central station, manufacturer and wholesaler. Finally, only those retailers who can present evidence of their business proficiency, through examination or otherwise, should be recognized as "accredited dealers."

The same general procedure should be followed by the company's service department and the manufacturers' and wholesalers' service organizations in teaching the contractor how to repair electrical appliances and maintain them in constant use. The service department should not go beyond the customer's meter, except in emergency cases when it was impossible to get an "accredited contractor." The company should compensate the contractor for his free servicing of simple troubles, such as fuse replacement, and should approve his charges for more complex jobs which yield a real profit. The company would not be out of pocket because its rates include the average costs of free servicing. The "accredited contractor" will enjoy enough prestige and profit to justify his taking the course and to warrant his readiness to serve the customer at all hours. Service complaints received at the company office should be referred to the accredited contractor whose place of business is nearest to the complainant.

The success of this dual plan for domestic sales through accredited retailers and for domestic servicing through accredited contractors depends upon the *supervision* which is exercised by the heads of company's sales department and sevice department. They must not only be constantly on the job locally, but they must keep closely in touch with the committee on customer satisfaction, upon which rests the final responsibility.

Conclusion

When the two committees have completed their preliminary work in elaborating these ideas, one in preparing the code and the other in outlining the courses of instruction for the accredited retailers and contractors who are in the front line of company contact with the public, the president of each power company should call meetings of the trade at convenient centers in his territory. There he should *personally* stress the danger of political competition as the incentive for unified action, explain why the functions of the contractor-dealer are to be separated, and tell of the concessions which his company is making for the sake of cooperation from the industry.

He should then introduce the representative of the committee on industry cooperation to present and explain the Code of Ethics which his company has signed and which the members of the trade are invited to sign. Next he should introduce the representative of the committee on customer satisfaction to outline the plan for accredited retailers and contractors.

Then the sales department should secure enrollments in the merchandising course and the service department likewise for the course on servicing appliances. Thereafter the work should proceed as previously outlined, with particular emphasis on building customer goodwill.

The entire industry would then be cooperating for the common good!

Improving All Selling Methods Will Sell More Domestic Use

By E. P. PENNEBAKER
District Storekeeper, Southern Sierras Power Co., El Centro, Calif.

WHAT are the most effective methods of increasing the domestic use of electricity? To attain the goal, I suggest as follows:

By education and effort we must create desire, demand, and craving for electrical equipment of homes. Competent salesmen and other employees, proper advertising, home-to-home contacts, constant thought and solicitation by all employees, sanely conducted sales to minimize repossessions and dissatisfied customers—all these are necessary.

Special drives for particular appliances in their season are timely and fine for arousing enthusiasm. The days when customers called (as just before 1929) and begged to have merchandise sent to their homes and connected up, are over. We must now SELL, SELL, and SELL.

The appliance manufacturer, the wiring contractor, the dealer, and the utilities must do their utmost to give the people their money's worth, satisfy them in every reasonable way possible, care for customers assiduously after they have connected with us, and endeavor by all means in our power to make them boosters for electrically equipped homes.

After all, the attainment of any desired end can be gained by no other means than hard work on the part of all affiliated with the cause.

Comforts

People in every work of life want to live comfortably and happily. They keenly desire to use more electrical equipment in their homes than they now do. I am sure it is the ambition of every husband to lessen household drudg-

ery for his beloved wife and family. They want electric ranges, water heaters, refrigerators, air conditioning, washing machines, vacuum cleaners, and the hundreds of other convenience appliances. Unfortunately, the present cost of operation frightens them; they fear going beyond their means.

The masses (wage earners) are the backbone of every business in the world. It is to them we must look for our increased load, and we must make it possible for them to have conveniences for happiness and contentment. We must educate them to the fact that electricity is comparatively cheap, no longer a luxury but a practical necessity, and that when they are fully electrically equipped they just cannot help being comfortable in mind as well as in body; that when they have all these conveniences their cost is not entirely "light bill" as so many now quote it when speaking of the cost of living.

Being electrically equipped there is no further need to worry, day or night, about coal, gas, wood, kerosene, gasoline, bad air, shortage of ice, and all the dirt and muss that go with them. The electric bill will then cover all these items and will eliminate the inconvenience of having so many items to watch and bills to run around to pay. One bill will include "all the necessities and comforts of home" in the kitchen, bath, dining, living, and sleeping rooms—in short, the entire house.

One can leave home for weekends or longer periods in perfect security, knowing all he need do on returning is to turn the little switch and in an instant everything needed is at hand—heat, hot range, hot water, good air—then too, the food left in the electric refrigerator is as fresh and perfect as when put in, all ready to eat or be prepared for the table. No running to the markets, calling up the milk man, the ice man, etc.

"What a Grand and Glorious Feeling."

All these desires of our potential customers can be advanced and made possible of realization by the close cooperation of the appliance manufacturers, the dealers, and utilities through an educational campaign sponsored, nurtured, and carried on by each and all. The manufacturers must strive to produce attractive appliances, to reduce their prices, and refrain from excessive profits for first-class items, and by no means stint their wares for price reduction purposes. The wage earner cannot afford to pay the prices now demanded, it is not in the cards these present days. No matter what terms are offered, a debt is a debt that has to be paid. No self-respecting family is willing to tie itself up so that all it works for is to get out of debt. The way must be made reasonably easy to create enthusiasm in the buyer, yet not to make him feel that he has a stone around his neck for the rest of his life.

Appliances

The utilities can ill afford to handle or recommend appliances not strictly first-class in every respect; the cost will be too great as to future service. Strange as it may seem, though we of the utilities know it to be a fact, people will go to bargain stores or to sales and buy cheap appliances. If they go bad on them they are quite philosophical. But the utilities are not so well favored by the public. No matter what price is paid the utilities for an appliance, the customer expects perfect action and continuous service. These same reasons for standard appliances at reasonable prices apply to the dealers and utilities. I think the manufacturer is the key.

Domestic Electrification

Second prize winning paper in answer to the problem, "What are the Most Effective Methods of Increasing Domestic Use of Electricity?"

All of us are entitled to reasonable profits in order to live. Volume, however, is now the crying need. It must be created with the thought uppermost that the new aggregate sales gained will recompense for annual profits to the same degree that former short sales and high profits did. Visualize, if you please, volume creation and use keeping everybody busy, happily working. When one is busy he buys instead of brooding over what he already owes.

Wiring

The cost of new wiring and repairing old houses is one of our great drawbacks in the sale of major appliances. A tenant does not feel he can pay for it because he gets nothing out of it when or if he moves. The owner of the rental property apparently can now see no good reason why he should or can make the additional investment without increasing the rent, which the tenant naturally resents. We must educate rental owners to realize this day and age requires modern homes for permanent and well paying tenants. We hope the time is near when tenants will rent only where provision has been made for convenient and comfortable living quarters.

In this regard the wiring contractors must be asked to cooperate and to be content with a lesser profit on each little job because it will help to create so many more of them. Perhaps the dealer and/or the utility can see some way to help out by a small subsidization of the contractor in order to equalize the cost of all concerned—always having in mind the creation of *volume*. It is suggested that we all investigate this phase thoroughly for mutual benefit.

For new homes and rental properties, our educational program must be extended toward owners, architects, contractors, and builders. Create in them the trend of the times for modern convenient homes.

The first cost of a perfectly wired building is a little higher, but the increase is so slight a percentage of the whole it should be lost sight of in consideration of benefits accruing. We must teach the builders to realize sooner or later these conveniences will be demanded and how much more a rewiring job costs. Even additional exposed wiring is comparatively expensive, not overlooking the unsightliness, possible effect on insurance rates, liability of dispute in settlement of a fire loss, etc. Both architects and owners know all this but are prone to overlook it in figuring costs—so let us keep after them.

Rates

It is fair to assume that all utilities realize the probability of reductions of existing rates. We must face and fight all the unfair competition plus political harangueing. We know our charges are fair and equitable for what we deliver; that we give for service until it hurts; that we do everything possible to promote the welfare of our community, but the public as a whole doubts our sincerity and is led on by false propagandists. Therefore, we must seriously consider our rates, their blocks and minimum charges, with a view to possible adjustments so that people will feel they can use all the electricity they want, even to extravagance, without the fear of an excessive drain on their purses. It is suggested that a proper minimum charge be made, proportional to connected load, and that block rates be readjusted to drive away the fear of high costs on first blocks before the lower blocks are reached by customers' current consumption.

This thought arises—that for a completely electrified home a rate be set up, likened to an industrial, to encourage plentiful use of all conveniences installed, this to apply only when no other means are employed for home operations. A rate set-up might be made covering homes not entirely equipped yet having a first-class array of major appliances justifying such consideration. For the casually equipped home, standard lighting rates would govern

until such time as either of the first two above mentioned conditions prevail. Thus would an incentive be created to reach such a plan of use so as to "do it all with electricity."

No attempt is here made to suggest kilowatt-hour rates as no set of schedules can apply to all locations. The local situation and condition must be met at home.

Salesmen

Salesmen are a most important adjunct to our industry. It is our duty to thoroughly, yes, intensively train them to our products and methods before having them venture to meet the public. After all is said and done, they are our first important contact with the public, whose confidence must be gained. We are judged greatly by their actions and behavior. A salesman must be trained to such a degree of competency as to warrant the company standing back of him for anything he may do in his efforts to increase sales of current and appliances. The public likes nothing better than to talk and deal with a direct representative in whom they know and feel that what he recommends is right and his promises will be fully carried out.

We must not at any time over-sell or unduly overload a customer beyond his ability to pay. Nothing creates greater discord eventually than for a customer to find that his enthusiasm, plus the encouragement of a salesman, has led him into too deep obligations, and that he is compelled thereby to drop some of his cherished purchases. This hurts pride, and more important, the purse—losing something on which partial payments have been made.

A salesman must be an upstanding, well appearing, educated person with a pleasing personality; a diplomat who can inspire confidence in people other than personal friends. Naturally, he must be a hard worker with high ambitions to carry on his job; ever-ready and willing to further our aims in every direction. He must be, himself, thoroughly sold on his undertaking in order to be most sincere in his efforts with his public contacts; a man of good sound judgment coupled with an abundance of common sense, able to take an unwarranted smack without loss of temper and the accompanying "flare up"; be polite and courteous even when knowing the customer is unfair or perhaps absolutely wrong. He must be well-mannered at all times.

This Paper Suggests—

Better education and training in selling the all-electric idea,

Greater volume of appliances at less margin so as to make them available to more people,

A drive to promote rewiring, with perhaps a subsidy to keep the cost low to consumers,

Special rate inducements to encourage all-electric homes,

Salesmen who can beget customer confidence and good will.

The importance of our demonstrator and her contact with consumers must not be overlooked.

Service men, meter readers, and office employees must be selected for natural characteristics necessary to fit them to be company representatives in their departments. Many a customer is lost, a disgruntled foe created by inattention, discourteousness, an unfortunate word, act or gesture. Every employee, in fact, should be selected for his ability and worth. Needless to say, all should be thoroughly trained and educated to our idea of the duties and the conduct of the position they are to occupy.

All Together

Each and every employee in all branches of service should carry in mind the fact his every act should be of help to the employer's business. We should look for and work out means and acts whereby we can be of benefit; do our job the very best we know how. Many have latent ability which by a single act will be recognized and proper encouragement offered for continuation. We should figure out what position we would like to occupy and prove by sincerity of actions and words our ambition, and eventually will gain the goal.

Remember constantly that all employers are seeking men for higher positions, are looking over their employees hoping to find among them a worthy subject for advancement. It is entirely within any man's opportunity to show that he is prepared and willing to demonstrate his fitness.

Be a "doer," have courage, stand up under adverse conditions, fight for yourself and employer, for your needs and benefits are mutual.

Know Your Problems, Then Sell to Increase Load

By ALLEN L. LAWS
Assistant to the New Business Manager, Southern California Edison Co., Ltd., Los Angeles

IN attempting to solve the problem of how to increase the sale of electricity to the various industrial and commercial classes of customers it would be well to start with an analysis of our various prospects in the light of the following questions:

1. Is the ratio of revenue obtainable from the load high as compared to sales expense?

2. Is the ratio of revenue obtainable from the load high as compared to connection cost; i.e. can a fair amount of revenue be obtained without incurring unreasonable expense by having to rebuild lines and facilities, or having to build lines long distances to inaccessible locations?

3. After developing the load will it immediately become vulnerable to competitive attacks, either from private power generation or from other forms of power?

4. Is the amount of available business large or is there a comparatively small portion capable of being developed by sales effort?

5. Are the prospective customers financially stable and is the new load justified on an economic basis to them, or will discontent on account of charges immediately arise with the result that the new load is disconnected, either through dissatisfaction or inability to pay?

6. Is the load factor good or will heavy demands occur during peak periods of the day?

With these points in mind a chart has been drawn up as shown herewith (Table I) which gives an analysis of various prospective load sources. This is a tentative arrangement, since other

TABLE I

	Ratio revenue to sales cost	Ratio revenue to connection cost	Vulnerability	Amount of potential load	Financial stability	Peak or off-peak	Total
Commercial and industrial lights..	3	3	1	3	3	1	14
Street lights	2	1	3	3	3	2	14
Agricultural power, new.....	0	2	2	0	2	3	9
Agricultural power, replacing engines	3	3	3	2	2	3	16
Small rural power.....	2	3	3	2	2	3	15
Air conditioning	3	3	2	2	3	3	16
Industrial power, new.....	3	3	3	3	3	3	18
Industrial power, added.....	3	3	3	3	3	3	18
Oil power, new.....	2	2	0	2	3	3	12
Oil power, added.....	2	3	0	2	3	3	13
Industrial heating	3	3	3	3	3	3	18
Commercial cooking	3	2	2	2	2	3	14

values might be assigned by another observer. Also, other load classifications might be added.

An arbitrary figure of 3 has been used to indicate the most satisfactory conditions in each division of the analysis, with intermediate figures scaling down to 0 to represent less desirable qualifications.

From this tentative analysis it appears that industrial power, both new and increment, and industrial heating have the best possibilities of development, while new agricultural load offers the least possibilities.

There is not enough difference, however, between any of these prospective load sources to justify ignoring any class entirely. All should be developed to the fullest extent but emphasis should be placed on those having the greatest possibilities and most desirable features.

A View of the Problem

New industrial load should be developed by encouraging outside industries to locate in our territory. This would be done by making use of a special traveling agent as discussed later.

Increment industrial load can be developed by maintaining a constant vigilance among all industries and as their natural growth is evident to be in a position to forestall competitors in their endeavor to obtain these new loads.

Industrial herting can be developed by having a small organization of specialists on call at all times to follow leads developed by the field organization. Electric heat has the advantage of close control, both in temperature and furnace or oven atmosphere. It is competitive with any other type of fuel except those cases, such as brick kilns, in which large volumes of heat are needed with little regard to control. Short courses should be given the general power man from time to time to enable them to develop prospects for later closing by the industrial heating staff.

Air conditioning does not have the possibilities of the straight industrial applications mentioned above. This is true because of the vulnerability of the load to competitive attacks from steam jet equipment, and competitive fuels. Also the field of profitable development is more limited.

Replacing of engines in agricultural areas offers a large amount of potential load, the amount being limited, however, by the number of engines available and the financial stability of those who have installed engines in a desperate endeavor to lower costs. In exceptional cases it will be advisable to purchase engines where prospects for good pumping loads are good and where connection costs are low.

Small rural power has many possibilities for development if a crew of creative salesmen be utilized to canvass all rural customers. The cost of this development is higher than in the aforementioned classes on account of the small units of load which can be considered. The amount of business is also limited and the financial stability of farmers is not especially good.

Commercial and industrial lighting is very desirable load on account of the high rate which this class of service carries, coupled with the fact that the connection cost is low on account of the proximity of other large loads. The bad features are its present vulnerability to private generation and likewise its peak operation. The latter feature, however, is becoming less important with the growth of other loads giving more system diversity.

Commercial cooking is a comparatively new addition to the family of load builders. The lack of stability of cafe and restaurant owners, and the consequent necessity of subsidizing the wiring costs or offering special inducements to them to purchase the higher priced electrical equipment limits somewhat the possibility of developing this load.

Street lighting has the advantage of better load factor than commercial lighting; however, the selling cost is higher on account of the political angle which must be considered. Also, connection costs are high on account of the small scattered units involved.

Increment oil power is excellent load but is now very vulnerable. Sales costs, both direct and indirect, (rate discounts and subsidies) are rather high and the government oil allotment program limits the amount of potential load.

New oil power is limited by the same factors as above; also connection costs are somewhat higher than for increment loads.

New agricultural load is very desirable but its development is limited to the amount of land under cultivation and creative effort is of no avail except as it increases our chances to obtain the business in the face of our competitors efforts.

Power Uses

Second prize winning answer to the problem: "What Are the Most Effective Methods of Increasing the Commercial, Industrial and Agricultural Uses of Electricity?"

Study Competitive Costs

In attempting to develop these loads to the fullest extent the main points to be considered are that the cost of the service on applicable rates is competitive with comparable service obtainable from either private power generation or from another type of energy. This fact being established, the situation becomes one of salesmanship.

As a preliminary step in such a determination a careful study should be made between the costs developed by the utility's rates and those resulting from competitive power sources. In many cases these will be found to be much closer together than our diesel and gas engine competitors would lead us to believe, particularly when the factors of dependability, voltage and frequency control, safety and convenience are considered.

After satisfying ourselves that our rates are competitive, except possibly for new applications not taken into account when the rates were designed, we can consider the selling problem. During the past few years all people have been price conscious, and I believe this has been carried so far that all sight has been lost of value. Therefore, rather than discuss price our selling program should be concentrated on selling the advantages of electric application supplied by a large stable power company. Much of our competitor's talk is based on the fallacious comparison between total electric cost and an apparent fuel cost of another power

supply. This fallacy should be explained, of course, but from there on price should be left in the background. Many times excellent sales arguments are lost sight of in a welter of futile price discussion. Even a cold blooded engineering analysis can be augmented with selling points which will enhance its value.

Two general classes of salesmen should be employed. One group should act as general contact men handling competitive jobs and acting as general supervisors. They should have a thorough understanding of rates and their application and should be high calibered men. The actual creative selling should be done by other groups, each member of which is a specialist in his particular field. Such groups should consist of the lighting men, the industrial heating men, the rural electric men, the commercial cooking men and on a given job involving several classes of load their efforts should be coordinated by the general power man.

EASTERN SALESMAN

The above plan will handle purely local sales but a plan to attract new large industries from the East or other localities must utilize other tactics. A suggested method would be to employ a general sales agent to travel throughout the East contacting every large concern which it would appear could profitably locate in our territory. His entire time should be devoted to this job and he should be supported by advertising on a national scale in the trade journals.

This paper suggests—

An analysis of the types and values of various industrial, commercial and agricultural loads so as to plan the sales program according to the difficulties involved and the profitableness of the business,

A return to selling of a quality service and away from the price arguments of the past distressed years,

A salesman traveling the East to contact and assist in bringing new industries to the West, backed by national advertising in trade magazines.

Back of all this selling effort in fact should be placed a coordinated advertising program stressing the advantage of electric power over that of any other type of power. The present electric consciousness engendered by the national government makes this an opportune time to capitalize what might otherwise be an embrarassing situation.

In conclusion, this discussion may be summed up as a sales program having as its first step an analysis of possible load sources; second, an analysis of rates applicable to that type of load to make sure that costs are competitive with other power sources, and lastly the development of a sales program to obtain the objective sought, backed by a capable advertising program.

The sales and advertising program of course is the most important, and rates, if competitive, are the least important. The old adage that the buying world will beat a path to the door of the builder of the best product of its type, even if that product be a mouse trap, no longer holds true. In these days of intense competition, his competitor with an inferior trap but a capable sales force and advertising program will get the business.

Business Building Brainstorms + + +

[***What the Industry needs is a brainstorm to destroy the power surplus pest—Arthur Markwart, president, P.C.E.A.***]

Sell Time-Controlled Electric Sunshine

28 Sun lamps have been on the market for a number of years, but, little or no attempt has been made to sell them to the general public. The practice of sun bathing in the summer time is already widespread, and it is growing rapidly, as anyone who has visited the beaches and river resorts will readily testify. Without doubt, the desire to continue this practice after the summer season is over constitutes a large potential market for sun lamps in the home and in indoor swimming establishments. This potential market can easily be converted into an actual one by advertising, and all of the load would be added to existing facilities.

Probably there have been some objections to general advertising of sun lamps on account of possible physical injury to individuals, who might use them unwisely or excessively through ignorance. This should certainly be no unsurmountable obstacle. The answer seems to be, either education along with sales advertising, or development of safer equipment by the manufacturers. Possibly some device to limit the time during which a lamp can function continuously without resetting would answer the problem.—Wm. T. Hannum.

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More Kilowatt-Hours For the Garage

29 Pride in a motor car is one of the accepted phenomena of our age. In order that the car may have what for the moment is considered the best oil, gasoline or tires, many will forego some of the more commonly recognized necessities and comforts such as a bathtub, telephone or adequate lighting. An automobile accessory store window will stop almost any man, and the new gadget will be purchased even at the expense of the sirloin steak or reasonable electric bill. A current-consuming device for an automobile is unusual, but the popularity of one of definite merit should be considerable.

Cold starting of gasoline engines always entails some difficulty in ignition, lowered starter speed due to oil drag, depletion of battery, lack of power, waste of fuel, dilution of oil on the cylinder walls, and excessive wear of cylinders and pistons. The latest cars may have an automatic choke which nicely adjusts the over-rich mixture, but older cars with loosely fitting pistons scarcely develop enough power to overcome friction. Current advertising proclaims the waste of fuel, and recent authoritative tests reveal that practically all cylinder wear occurs at the time of starting.

All of these difficulties may be obviated with a warm engine, and without question electricity is the ideal medium to furnish the heat. Indirect methods of heating require either an expensive installation or clumsy operation; flame

is too hazardous. Doubtless a glow type radiant heater directed at the intake manifold, or a flatiron placed on it would be effective, but costly to operate.

Most efficient would be an immersion heater of about 100 watts permanently screwed into the water jacket between the middle cylinders. A drop cord could even be arranged to pull itself free on backing the car, connection being made and broken without lifting the hood. An ordinary inexpensive electric soldering iron of the same capacity could be utilized in a similar manner by inserting a closed end copper tube in the block, and in this tube placing the iron.

Cars equipped with thermostatic control would have the ideal arrangement for this treatment, but all would have the warming-up period materially lessened. Most certainly a gain of 30 or 40 deg. over the ambient temperature would be decidedly helpful in overcoming the difficulties of cold starting.—Arthur K. Ingraham.

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Advertise—10 Kw.-Hr. Equals One Slave

30 Most people think and speak of the electric bill as the light bill, a curious hangover from the industry's early days and a sharp contrast to the advances of this most progressive business. Perhaps it's because we are so accustomed to the convenience of electricity that we forget its utility; but it must be evident that lights alone, while tremendously important, form but a minor part of the countless ways in which this ubiquitous agent serves us daily.

It might help to urge consumers to think of electricity in terms of service performed — the number of slaves, husky ones at that, required to produce equivalent effort. With a good metabilism and three or four thousand calories of food a day a man could produce about 1/3 kw.-hr., 10 a month. The army ration, the food cost per man per day, is now about 42 cents. Expand this by additional taxes, retailers, NRA, then add clothing, lodging, care, insurance, and administration; even without wages or provision for dependents such muscle work would cost at least 150 times the utility charge.

Formerly the number of servants was a measure of a person's position in life; in a way which implies no human enslavement this same yardstick may be applied today. Those who use electricity abundantly are enjoying at very low cost today's full living.

Let us then stamp on the monthly bill a picture of a slave or genie for each 10 kw.-hr. or major fraction thereof; a remainder of the utter cheapness of electrical energy and an inspiration to add to the retinue. An explanatory note such as given below would answer the curious, suggest greater usage.

"You have had the equivalent services of these men working hard eight hours a day for one month. No slave ever cost so little or toiled so ungrudgingly. Why not enrich your living by adding more of these willing fellows at a penny or less a day?"—Arthur K. Ingraham.

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Kilowatt-Hours Will Banish Insomnia

31 Millions of persons go to bed at night only to toss about restlessly for hours, until they fall asleep from sheer exhaustion. Why not conduct an extensive advertising campaign, reminding the public of the soothing effects of music and advocating the use of bedside radios to banish that terrible demon INSOMNIA. A time switch connected up with the radio would take care of turning it off at some predetermined time. Most people are not even aware of the fact that such switches are available.

Also it seems to me there's lots of room for improvement in bedlamps, for those who like to read in bed. How about an I.E.S. bedlamp?—*C. A. G.*

Prizes aggregating $50 will be awarded for the best business building ideas to dispose of the industry's power surplus published in *Electrical West* during the six months, May to October, inclusive. Prizes will be awarded by the Northwest Electric Light & Power Assn. and its officers, together with the editor, will act as contest judges. Business-building merit, practicability of application and originality will be the basis of judging and the opinion of the judges will be final in awarding $25 for the best idea submitted, $15 for the next best and $10 for the third best.

In addition *Electrical West* will pay $2.50 for each idea considered worthy of publication by the editors. Suggestions preferably should be limited to 400 words or less, may be published under a nom de plume and should be sent to the editor.

More Power To The Mining Industry

32 That the mining industry in the West presents a large field for the use of electric power seems in a great many cases to have been overlooked. With the rise in price of various metals, many new or long dormant mines are being opened for operation.

In a great many cases these mines are near the existing lines of utilities, yet they are installing Diesel and various other power plants for operation of their machinery. This, of course, is to be expected where the mines are located at such a distance from power lines that the cost of building transmission lines would be excessive. In some localities, however, the cost of transporting fuel oil over a period of time may offset the cost of building transmission lines to the property.

Engineers for the utilities could investigate the possibility of use of electricity rather than other forms of power for the mines in their districts, and could give a free advisory service to the mine owners. Electric service would provide a means of using machinery in the most economical manner. Motors and machines may be placed where they can be most advantageously used, while with a Diesel plant, all machinery must be placed in a central plant. Adequate lighting of the premises is a great advantage, and in many instances electricity may be used for heating and cooking.—*C. R.*

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Keep Range Units Up To Efficiency

33 Regardless of what advertising may say or infer, electric range elements do deteriorate. and as the process continues they get slower and slower. This is responsible for a lot of the talk about slow electric ranges.

Whether servicing is free, partly so, or done only at full cost to the consumer, the elements should be kept up to as near their original efficiency as possible.

Efficiency pump tests are being made with excellent results. Why not the same with ranges? An insulated hood to cover the element, with a high temperature thermometer, or thermocouple together with a timing device could be designed which would show the performance of the unit. If unsatisfactory, the cause could be determined and corrected.

A periodic check would be a splendid public relations opportunity besides keeping our range customers well satisfied.—*C. H. E.*

Explain the Bill Increase the Use

34 Coincident with the depression, a change in the public's friendly attitude toward the public utilities has become increasingly apparent. Several reasons have been advanced in accounting for this, losses sustained by investors in utility stocks as one and political pressure and agitation for another.

It is doubtful if either of these are really more than contributory if all the facts are considered. The real underlying reason for this change of sentiment on the part of the public comes of a deeper origin; is neither financial nor political but fundamentally psychological in aspect and universal in scope.

The politician has been shrewd enough to recognize and capitalize a natural advantage in furtherance of his own devious ends. It does not follow that he understands or cares how this advantage came to be his.

A negative attitude has been building up for several years within the individual customer himself and the utilities are largely at fault for this condition. The average customer, the man who pays the bill, is seldom a willing party to the increased use of electricity. To him increased usage means increased costs. His natural reaction is continually toward curtailment rather than added usage. Only by breaking through this resistance can the utilities hope to build normal and vitally necessary loads.

During the boom years of the nineteen hundred twenties, when everybody had money, the electric bill could go up a dollar or two and nobody cared. Public and utility relationships were most agreeable. With the scaling down of individual incomes, however, came the necessity of a corresponding cutting in expenses in the desperate attempt to balance the domestic budget. The effect is universal, not alone with the twenty million utility customers but with the utilities and the whole world, national governments included.

In this great budget balancing fight the electric and gas bills are by their very nature made a special target for this reduction. First, they are not fixed month to month charges like the rent, and second, they represent commodities of a more-or-less intangible nature as compared to bread, potatoes or coal. Third, little or no attempt is made in customer billing to arouse any consciousness in the individual as to what the bill really represents. An antagonism, conscious or sub-conscious, is gradually built up.

Consider a typical case: Dad and Mom Allen and their three half grown children. With the flood of month-end bills, Dad receives one from the electric company. It reads something like this: "For 234 units consumed, you owe us $7.21." With that bill Dad is sure of just two things: that he owes the electric company $7.21 and that it is $1.02 higher than the bill for the previous month. Right there the campaign is launched for the reduction of the next month's bill and orders given, perhaps, to turn off a part of the light and not to use the electric iron or whatnot.

Poor meek Mom in her desire to cooperate will probably do the weekly washing by hand in order to save the few pennies that it costs to operate the washing machine motor. The same sense of false economy applies that would prompt her to walk five miles to town to save the five-cent car fare. The electric bill to Dad still means just the light bill. He checks back with the corresponding month of 1912 and finds he paid $3.60 and in 1920 $4.80; these amounts against the current bill for $7.21. He has forgotten, if he ever really knew, that he paid at the rate of twelve cents a K.W.H. in 1912; ten cents in 1920 as against the three cents of 1935. Little or no credit is given for more and better illumination, increased use of labor saving devices and greater release for his wife and family from the home maintenance drudgery.

In comparison with the other household bills the electric bill is, at its best, handicapped. Groceries, meat and milk totals can be checked against the daily delivery slips. Supplementing the monthly statements are concrete evidences of loaves of bread, cans of vegetables and fruit, bottles of milk, pounds of butter and parcels of meat delivered and served upon the family table. A ton of coal has dimensions; a person can fall over it, we know it is there. The electric bill is just a total.

Something must be done to make the Dad Allens conscious of the many benefits of electricity. Suppose in place of the usual bill, Dad was to receive an itemized invoice covering the $7.21 something like this:

For the furnishing of light for the home for 720 hours—illumination comparable to and rivaled only by the sun at noonday, at a unit cost of .0035 cents per hours	$2.55
To furnishing porch light for accidents and burglar protection for thirty days	.10
To preparing fresh delicious hot toast and waffles for five people for thirty breakfasts at a unit cost of one half cent per person per day	.75
To washing dishes for ninety meals	.25
To washing linen and clothes for five for 4 weeks	.25
The family ironing for four weeks	.40
Furnishing refrigeration for the family food supply, frozen desserts, ice cream, cold water, etc., at a cost per day of six cents	1.80
Supplying heat comfort for the bath room	.31
Cleaning house with the vacuum cleaner one half hour each day, the dustless way	.15
To keeping the time and awaking the family at a pre-determined hour each morning for 30 days	.05
To bringing in the news of the day, sports, baseball, football, national and international politics, household helps, medical advice, health hints, the world's finest drama and music, and a thousand other interesting, useful and valuable things almost free of all charge	.65
	$7.21

It is obviously impossible to invoice each domestic customer so elaborately, desirable as it might be in stimulating the consciousness of the users to the possibilities of electrical energy in the home.

It is possible, however, to accomplish this, at least in part, by making use of a system of standardized printed stickers made out to cover graduated amounts of energy units consumed and attached to the bill of the customer. These stickers could be made up in a series to cover the minimum bill customer and up; graduated say, for an increase of each 25 Kw.-hr. up to the first hundred; then perhaps for 50 Kw.-hr. up to two hundred and so on. The following could be a sample: for the typical bill above of 234 Kw.-hr.

"The amount of energy consumed as shown by this invoice is sufficient to completely illuminate a six room house, do the washing and ironing, supply refrigeration, heat for a bath room and energy for the vacuum cleaning. Also prepare the toast, waffles and percolate coffee for a family of five for a period of thirty days."

A typical form for a bill of 42 Kw.-hr. might be as follows:

"The energy consumed as shown by this invoice is sufficient to properly light a home of four rooms, do the washing and ironing for a family of four for a period of thirty days and operate the electric clock and radio, etc."

Load building suggestions can be incorporated, particularly in the low energy consumption bills, by calling attention of the customer to what ten or twenty or thirty additional units will do for them. Stress units of work and not price or amount.

Let the bill carry a message of good cheer and not just month-end gloom.

—*R. V. P.*

Bill Jones Speaks + + +

about Learning from the Tiger

"WELL," said Bill to the Manager, "I see you have started a new department in your company. Let's see, what's the name of it? I don't seem to recall it at the moment. It has something to do with relations of one kind or another, hasn't it?"

"Yeh," said the Manager. "I am calling it the Industrial Relations Department. A lot of companies have officials whose primary job is to bring about that family relationship in corporate organizations, which seems to be so difficult at this time, and I have a new man to serve as Industrial Relations Manager."

"Well, well," said Bill, "Industrial Relations Managers, eh? If that isn't something! I take it that title is supposed to to act as window dressing for a department which presumably is trying to make an organization human. What a wonderful thing it would be if the Manager could set up a machine in his office, and whenever he felt the need of injecting some real garden-variety human spirit into his organization, drop a ten dollar bill or a thousand dollar check into it, first taking a couple of pills to improve his own digestion, and thus accomplish the desired result. I suppose you have read where somebody else has done this sort of a thing—probably heard a lot about the personnel work promoted by Bethlehem Steel, International Harvester, United States Rubber, etc., a few years ago. And of course it isn't worth while to make any attempt to convince you that however enthusiastically these various schemes are launched, and however idealistic they may be—with a lot of talk about the brotherhood of man and the community interest and partnership existing between men and management—they frequently wind up in a strike.

"It is very interesting to learn what this company and that company are doing to tie their workers to them, but my own personal opinion is that I shall seek for knowledge in an entirely different quarter—Tammany Hall. Give me twenty minutes observation and study of the day-by-day history of Tammany Hall, and so far as I am concerned, you can burn the libraries of industrial relations, and the country's greatest industrial organizations won't need to copyright their own pet systems on my account. Tammany Hall doesn't send booklets around about the cold-pack method of preserving tomatoes when the family of a faithful follower is out of food, or requires medicine. Instead, it sends food and shoes and money where it is needed, or where it will give the greatest return to the Hall.

"Now, of course, if I knew anything about the financial end of operating a public utility, I would know it isn't business to loan money to employees to ease them over those rough spots which we all experience now and then—that you will lose most of it if you do, and besides, the act will accomplish no good purpose. The whole thing is unsound and unscientific. There is nothing wrong about this statement as an item of news, except that it is old. It is strange that some managers are so slow in comprehending a fact as self-evident and so unanimously and universally conceded, and just because they are not losing any considerable amount of money, they make loans to distressed employees, and I suppose they will continue to go through life not knowing how impossible their success is.

"Tammany Hall holds its rank and file—through thick and thin—because it treats it in a thoroughly human manner and because it doesn't know the meaning of the term 'Industrial Relations.' Tammany doesn't always capture enough votes on the outside to win every election, but it does go into the fight with a united family, and come to think of it, its batting average is not so far from 1000 at that. And so, as between the professors, who really wouldn't know a family spirit if they met one in a bottle or a churchyard, and the very wise, very subtle, very human politicians who handle Tammany Hall — my money goes on the Hall.

"Now, whether the Postmaster General of the United States or the man who ostensibly is his boss, is really the boss; or whether the Postmaster General is, is a purely academic question, the solving of which is not necessary at the moment—particularly as both received their education and their inspiration and their system from that great human organization whose symbol is the tiger. It would be less than patriotic to cast aspersions on the Hall in such circumstances.

"The public utility industry has tried politics, and failed. It has tried legal battle, and failed. And now if it is to survive, it will try the only thing which has ever had a chance to win, and which, since man was first created, has never failed—the human touch. The secret of the whole thing—if it be a secret—is to be found in taking care of the little things, the minor points, of contact with people. The man who doesn't recognize this fact was behind the times the very moment that Eve threw away the first apple core, and human nature became an established fact."

Coyotes Corner a Wildcat—Lights Out

A DESPERATE battle of the wild which ended by plunging half the San Bernardino Valley community of Alta Loma into darkness not long ago was disclosed when linemen repaired damage to the Southern California Edison Co. circuit serving the town. Unprecedented in this community, averred the Ontario Daily Report, the encounter was a contest to the death between a wildcat and, presumably, a pack of hunger-maddened coyotes. It was H. D. Robbins, Edison Company "trouble man" who discovered the grim remnants of the struggle. Evidence of the vicious fight to the finish, the Daily Report said, was found in uprooted brush and clawed ground. And at the foot of the pole where the trouble originated lay the body of a wildcat, electrocuted. As the linemen reconstructed the wierd occurrence, the wildcat had been cornered by the coyotes, emboldened by protracted hunger. At last unable to repulse its harriers longer, the wildcat, desperate and nearing exhaustion, climber the power pole. It came in contact with two wires, carrying 11,000 volts each—and the lights went out.

Some of the equipment used for making the pictures, including one of the new-type amateur 16-mm. sound cameras.

Visual Education Builds Agricultural Load

By H. D. KEM
The California Oregon Power Co.

THE problem of adding power load in sufficient volume to justify additional rate reductions and keep pace with electrical development has been present in ever increasing importance since the beginning of the electrical age. Within the last two or three years the utilities have found themselves (as a result of the dissatisfaction and turmoil of the recent depression) in the uneviable position of fighting for their very lives. The insistant demand for reductions in electrical rates to conform to depression prices was for most utilities an impossibility unless additional load could be placed on the lines already built.

For years Glenn L. Jackson, vice-president in charge of sales for Mountain States Power Co. and The California Oregon Power Co., as head of the new business departments of these two companies had aggressively promoted the added use of electricity. The usual methods for increasing individual consumption of electricity had been used aggressively and new methods of educating our customers in the use of electricity were constantly being inaugurated.

However, Mr. Jackson's load-building problem is an especially difficult one. Most of the communities served by these companies are small and widely scattered, one or more of them being located in each of seven Western states. Naturally an exceptionally large percentage of our customers were rural customers and because of the wide territory covered by our rural lines a practical and efficient method of convincing these rural customers that the additional use of electricity on their farms would prove good business presented unusual difficulties.

Remarkable success has been enjoyed by the California Oregon and Mountain States Power Co. in selling the idea of rural electrification by means of a sound film produced by its own employees. This film, "Jim Stays on the Farm," has been shown to thousands of customers and a second film is now being made.

In July, 1934, Mr. Jackson decided to reach these customers through visual education, employing motion pictures of the various successful rural electrical installations in our territory. Obviously, a motion picture of this type would have to be made for the particular job it was expected to do. It was equally obvious that the expense of a professionally made picture could not be justified. The small 16-mm. amateur film had been successfully used by manufacturing companies to carry their message to men in the field. Mr. Jackson decided to see what could be done with this comparatively inexpensive medium. The head of the advertising department was an amateur motion picture cameraman with several years of amateur camera experience. A conference was called with C. J. Hurd, agricultural engineer, head of the Rural department, to superintend the work, D. A. Runyard of the rural department of The California Oregon Power Co. to collaborate and H. D. Kem, assistant sales manager in charge of advertising for the two companies as amateur cameraman. As a result of this conference the work was undertaken.

As was to be expected, difficulties immediately arose—not in the actual photographing or the ability to portray visually the various successful rural applications of electricity, but in the method to be employed to give the necessary facts, figures and explanations that would make the visual part of the program effective. Verbal explanation of the various applications and scenes as they were flashed upon the screen was the natural procedure.

But no amateur 16-mm. sound film camera was at that time available. In an attempt to solve this problem, disk recording equipment similar to phonograph recording was assembled. Five months after the start, the sound film, "Jim Stays On the Farm," was completed and showings immediately started, using a sound-on-disk projector in which a phonograph disk synchronized to the film provided the sound accompaniment for the picture.

The complete film requires fifty minutes to show and has music and voice accompaniment throughout. The skeleton story used to tie the film together, opens with two old people on a farm which has no electricity. The boy returns from college wanting to get married and very enthusiastic about electrifying the old farm. To overcome the objections of his father to this "new fangled notion" and prove that the use

of electricity on the farm is not only convenient, but good business as well, he persuades the old man to make a trip throughout the rural territory we serve and see the various electrical appliances in actual use. Their trip covers the various uses of electricity for irrigation, poultry farming, dairying and other farm uses; ending of course in convincing the old man that electricity is a very desirable thing. The building of the power line extension follows with the installation of a few household conveniences and ends with the final clinch when Jim gets his girl.

The story part of the picture, until Jim and his father leave on their trip, has musical accompaniment, the various electrical installations are accompanied with a ghost voice explaining them and giving a statement from the owner as to costs and his satisfaction with electricity over former methods. No outside professional help was used at any time.

The film was immediately successful, far beyond what was expected. The lecturer of the State Grange publicity endorsed it and mailed a letter to every Grange in the territory served by us, urging them to see the film. Within a short time we had more requests for immediate showings than could be arranged. Almost without exception the halls where the picture was shown were crowded. Mr. Jackson found these customers and potential customers as eager to learn what other farmers were doing with electricity as we were to tell them. This film has been showing almost every night since completed and more than a month's showings are booked ahead at this writing.

C. J. Hurd, agricultural engineer, California Oregon and Mountain States Power Co., under whose supervision talking films of rural electric applications are made.

Shortly it was discovered that our crude sound disk equipment was inadequate for the extensive program that was developing. An up-to-date sound-on-film 16-mm. projector was purchased. We have found this equipment capable of showing a good picture 12 ft. wide and with sound of sufficient quality and volume to show to audiences numbering more than a thousand. The quality of both picture and sound with this equipment really requires no apologies. In order to use this equipment a copy of the picture was made and the sound recording added to the film itself at comparatively small additional expense.

Sound projection equipment, camera, loud speaker and screen, are entirely portable.

I believe visual education through the medium of amateur motion picture film offers an excellent method of showing electrical customers the advantages of electricity more convincingly than can be done by any other method.

We are already preparing a new film for use next winter which it is hoped will be more effective even than the one we are now showing. Benefitting from our previous experience the new film should be produced more effectively with less effort and little expense other than the photographer's personal expenses in visiting the various locations and the cost of the film. I believe the production of similar films are entirely practical for others if the same care is used in preparation as would be used with other advertising matter and the services of a good amateur motion picture photographer is available.

Farm Improvements Subject of New FHA Booklet

A booklet which should be of vital interest to all utility commercial departments interested in farm electrification is available through the Federal Housing Administration, Washington, D. C. The booklet, known as FHA-136, describes improvements to farm property which can be arranged through the Federal Housing Administration. Electrical equipment is given prominent display as a means of improving farm life and the subject matter suggests many electrical conveniences for the farmer. Those interested in obtaining copies of this booklet may obtain the same from the Federal Housing Administration, Washington, D. C.

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• "Modern Methods for Growing and Marketing Flowers and Vegetables" is an attractive booklet which deals with soil heating applications and installations, gives costs, describes hot bed lighting and greenhouse lighting and soil sterilization by electricity. It has just been issued by General Electric Co. for distribution to rural customers by agricultural departments of utilities. Garden lighting and lighted plants are also illustrated in attractive fashion in the brochure. Effective use can be made of this brochure in direct mail efforts of utilities or dealers in this equipment.

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• Electrically Heated Hot Beds and propagating beds are treated in a circular, No. 335, of the Agricultural Experiment Station, University of California, College of Agriculture, and written by B. D. Moses and J. R. Tavernetti, agricultural engineers. Descriptions of installation and estimates of cost of operation are included.

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• "Measuring Water for Irrigation" is a new bulletin, No. 588, issued by the University of California, College of Agriculture, and written by J. E. Christiansen. The booklet contains 96 pages of valuable information as well as listing the various measurement methods and giving tables for measurement of flow and volume.

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• A Home Workshop exhibit on the Yakima sales floor of Pacific Power & Light Co. drew 2,565 persons during a 3-hour exhibition. This was considered a record of some kind by Lewis A. McArthur, vice-president and general manager, who acted as one of the judges. This demonstrated the interest that exists in the home wood-working tools now available to the trade.

Cooperation on Parade + + +

[*Forecast of forthcoming cooperative merchandising activities, and review of activities in progress or completed, a summary of cooperation at work throughout the West*]

Results of Utah Light Campaign Summarized

HIGHLIGHTS of the Utah Power & Light Co.'s cooperative Better Light-Better Sight campaign conducted during the winter season just passed have been summarized by the dealer coordination department of the company. The total company and dealer sales combined for the period are as follows:

Company and Other Dealer Sales

6,960 study lamps
2,223 reflector type lamps, 250 watts or larger
1,384 pin-it-ups, lamp socket extension fixtures
7,413 misc. bridge, floor and table lamps
3,056 demonstrations in homes by 9 home lighting advisers
707 commercial lighting jobs.
Sales volume.....$226,363.00
Kw. load added..... 3,423 kw.

Further analysis indicates that the study lamp is worth $2.15 additional revenue per year to the company, the reflector lamp $5 additional. Home lighting demonstrations on this basis are worth $4.20 increased revenue per year. The company itself sold only study lamps, pin-it-ups and lamp socket extension devices directly. Employees of the company participated in the sale and were paid a commission, plus a free lamp for the sale of ten or more lamps. Much of the success of the campaign is attributed both to the dealers and to employees of the company.

The employees were given "science of seeing" fundamentals by means of lectures and printed material. At the beginning all employees were urged to take a study lamp home, try it out without obligation so as to learn its advantages first hand.

Sales promotion included newspaper advertising, publicity articles, cooperation with and by eye sight specialists, lectures, demonstrations and the showing of sound films on seeing.

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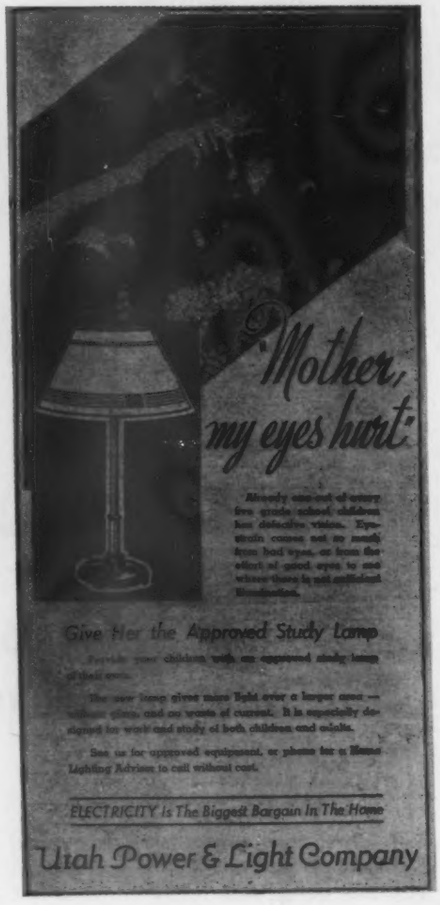
Mixers on Top Among Utah Dealers in July

Closing a month of exceptional sales in small appliances, dealers in the territory of Utah Power & Light Co. will feature mixers and beaters and electric fans during the July period. Continued activity on domestic refrigeration and on domestic air conditioning systems will be followed throughout the summer months.

The June bride campaign featured toasters, waffle irons, sandwich toasters, percolators, roasters, grills, mixers, etc.


"Mother, my eyes hurt."
Give Her the Approved Study Lamp
ELECTRICITY Is The Biggest Bargain In The Home
Utah Power & Light Company

Dramatic and human interest appeal was made in a series of advertisements, of which the above is a reproduction of one, and which resulted in the sale of large numbers of I.E.S. study lamps both by dealers and the utility

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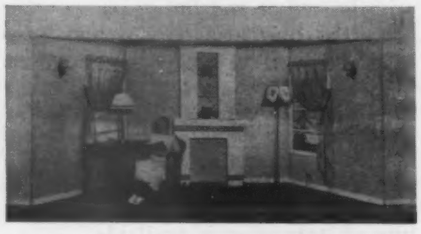
Thus was better lighting demonstrated to the women of Utah by an act in the traveling home show taken on tour by the Utah Power & Light Co. throughout its territory. Another scene depicted a kitchen with proper electrical equipment



Edison Lays Stress on Low Cost Electricity

Continually hammering away at the low cost of operation of electrical appliances on a per day basis, as well as bringing forth the fact that the use of an electric water heater brings the customer electricity down on the lowest rate, the Southern California Edison Co.'s cooperative advertising is paving the way for dealer sales during the summer.

Electric refrigerator advertising is definitely aimed to meet the competition of gas refrigerators whose claims of low cost of operation, silence, and modernity, are met by some of the additional features of an electric refrigerator, such as the absence of flames, which gives complete peace of mind, the absence of plumbing, which means that it can be plugged in anywhere conveniently and quickly, and its real economy of operation.

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P. G. and E. Customers Using Half-Off Electricity

Featuring both "bargain price electricity" under its "half off offer" and the special financing opportunities available under the Federal Housing Act loans, dealers in the territory of the Pacific Gas and Electric Co. are stressing electric ranges and water heaters as well as electric refrigerators during the summer months. According to H. M. Crawford, general sales manager, a recent count showed that 238,346 families were taking advantage of the one-half off electricity, indicating not only larger appliance purchasing but also longer hours of use.

Dealers are urged by Mr. Crawford to take full advantage of the excellent credit situation for the sale of major appliances and to stress the special discount on extra electricity which many customers are finding to mean savings of $3, $4 and even $5 a month. The combination of excellent circumstances make the opportunity one of the greatest the dealers have ever enjoyed for the sale of major appliances in the northern California territory, according to Mr. Crawford.

●

• PENDLETON DISTRICT, of Pacific Power & Light Co., led in a sales campaign for electric flat irons recently with 250 per cent of quota. A total of 250 irons were sold, or a system quota of 104 per cent.

Dealers Stage Campaign; Beat Own Sales Quota

THAT a cooperative sales campaign among electrical dealers can be a success where organization and direction are given to the problem was definitely proved in the San Joaquin division territory of Southern California Edison Co. when the Edison General Electric Appliance Co., Inc. provided the leadership and the dealers provided the sales. Since the Edison company does not merchandise ranges in this territory, the problem of staging the annual Hotpoint range campaign fell upon the manufacturer and the dealers.

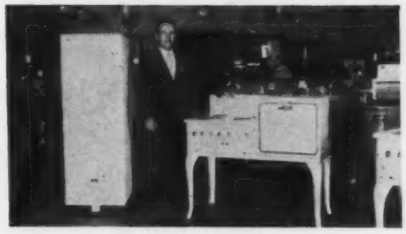
First it was necessary to organize the dealers into a compact and effective selling organization in each town in the division and next to have a uniform campaign plan, a uniform price structure and a continuity of effort inspired by competitive activity within the dealer group.

Clyde Allen, of Edison General Electric Appliance Co., called together the Hotpoint range franchise dealers into a meeting proposing the plan to them last December. At this meeting it was recommended that each dealer accept a quota of electric ranges for the campaign period. The quota was based on past performance in the territory that each dealer covered; not past performance of the dealer but of the number of ranges installed in that dealer's district which corresponded to the utility company's district office in this particular division.

The object of the campaign was to remove obsolete ranges from power company lines and replace them with the modern up-to-date electric ranges. Southern California Edison Co. agreed to allow dealers $20 for each old electric range removed from its lines. This allowance together with additional allowances offered by the manufacturer made it possible for the dealer to enjoy his regular margin of profit after the attractive trade-in allowance had been deducted from the regular selling price of the range.

Quotas were accepted by eleven dealers giving complete coverage of the entire Visalia region. A quota of 150 ranges was set. The last of March, at the end of the campaign, showed these dealers to have sold a total of 165 ranges. A high percentage of this total was sold by four out of the eleven dealers.

The winning dealer, Exeter Electric Co., at Exeter, Calif., made 350 per cent of total. Second place went to Jones Hardware Co. at Porterville with 216.7 per cent. Carrel's Electric Shop at Lindsay, with 137.5 per cent, and Woodlake Hardware Co. at Woodlake, with



This is Paul Chambers who came out of the shop and found he could sell ranges to his greater profit

133.3 per cent, completed the third and fourth places in this campaign.

It is interesting to know that Paul Chambers, owner of Exeter Electric Co., originally entered the electrical business as a one-man electrical contracting shop. He took a lukewarm attitude toward electric range merchandising and then found that it was possible for him to sell ranges. With a taste of the profits from electric range sales, Mr. Chambers hired a man to take charge of his contracting business and, as was reported, "got himself a nice blue suit, cleaned his fingernails of the wire and tape, and went selling."

It is also said that the hardware store proprietor stopped taking orders for horseshoes, nails and pick handles and he, too, went into selling electric ranges, to his great profit.

The San Joaquin division of the Edison company comprises about 14,000 residential meters. In view of the possibilities and the range saturation, the dealer campaign was considered a very successful one both by the manufacturer and the utility. The dealers who actively participated also felt that it had brought them welcome business during a usually slack period in the spring.

●

FHA Loans Liberalized

Liberalizing the conditions for granting of federal housing loans, so that any person of good credit standing in a community can take advantage of the terms, has been a great boom to the electric appliance business throughout the West. Late in June an order was issued permitting others than property owners to buy home equipment under the financing of the Federal Housing Act. Immediately dealers in electrical appliances advertised this extensively, offering the 3-year terms and no down payment which are available under the Federal Housing Act terms to any family of good credit ratnig in the various communities of the West.

Uniform Terms Offered by B. C. Dealers

Uniform terms are now being quoted on all refrigerators sold in Vancouver, B. C., by the central station, department stores, leading electrical retailers, and practically all firms handling these appliances. The same basis is also adhered to by a number of stores in areas adjacent to Vancouver.

The schedule of terms was worked out jointly by the credit manager of the larger firms. It has now been in effect since mid-spring and has been found to have worked out very satisfactorily. Also it has eliminated much of the former sharp competition.

Refrigerators under $150 are sold on terms of $5.00 down and $5.00 per month for 28 months. Those of greater value are sold on the following terms:

$151 to $225 for $ 7.50 cash. Balance divided over 28 months.
$226 to $250 for $10.00 cash. Balance divided over 28 months.
$251 to $275 for $12.50 cash. Balance divided over 28 months.
$276 to $300 for $15.00 cash. Balance divided over 28 months.
$300 and over for $20.00 cash. Balance divided over 36 months.

Sales of refrigerators as a whole in Vancouver are reported on fairly authorative estimates to show a slight increase over last year to date.

●

Los Angeles Dealers Carry Heaviest Ad Schedule

Tying in the June bride and the family appeals to electric refrigeration, the Bureau of Power and Light, of Los Angeles, advertising has been featuring refrigeration during the month of June. The heaviest refrigeration advertising lineage since pre-depression days is indicated by the schedule of local dealers' advertising during the same period.

With the liberalization of the National Housing Act to provide terms for the purchase of electrical equipment to any resident of good credit standing, a tremendous impetus is expected in the electric range and water heater, as well as in the refrigerator business of dealers in Los Angeles.

●

• NEW RECORDS for sales of electric ranges and automatic water heaters are being made by the "City Light" sales division, J. D. Ross, superintendent of Seattle's municipal system, reports. "We are still two weeks behind incoming orders," Ross stated last month. "In January and February, electric range sales increased 65 per cent over corresponding months last year, and the March and April sales have increased 202 per cent, with the ratio of increase steadily mounting."

Company-Dealer Sales Coordination Brings Marked Results

By C. J. GALLOWAY
Merchandise Promotion, The Washington Water Power Co., Spokane, Wash.

THE year 1934 presented to this company positive proof that through the cooperation of dealers we have our greatest opportunity to build residential load during 1935. No less than 400 dealers, ranging from large department stores to small contractors' shops, with their 2,500 employes, are coordinating their efforts with ours this year to sell more and more modern appliances in the territory we serve electrically.

During the year 1934, dealers sold 106,451 pieces of electrical merchandise. For 1935, the estimated sales of 118,581 pieces represents an increase of 12,130 or 11.4 per cent in unit sales. Results for the first four months of 1935 already indicate that the estimate is conservative.

This dealer merchandise in dollar volume for 1934 amounted to $1,824,950. The estimated dollar volume for 1935 is $2,135,875, which represents an increase of $310,925, or 17 per cent.

The new business placed on our lines, excluding replacements, shows an estimated annual revenue of $185,306 for 1934, and for 1935 the estimated annual revenue will amount to $208,580, an increase of $23,274 or 12.6 per cent.

We are aware of the fact that dealers must have made a very satisfactory profit from the sale of this merchandise during last year and will continue to do so throughout this year. At the same time, we are happy to say that the volume of business has also been highly satisfactory to the company. This coordination of effort has been a great help to us in our load building program. In fact, the dealer has now become a partner with us, and as a partner he is entitled to the fullest amount of appreciation and helpfulness on our part.

To those interested in actual figures the following summary (Table I) for the whole system in relation to sales made in connection with the recently concluded Better Light-Better Sight campaign will be significant. In each of the five classifications, the quota set (Q) is given, followed by the company sales (C) and the dealer sales (D). In each case, the combined sales of (C) and (D) far exceeded the quota set, and the dealers' share in the results was most gratifying.

A new service is the monthly report of all sales in each city on our system. This monthly report with its information will be of value, as it will give a perfect picture of the total local market and all participants, knowing their own sales, will see at a glance the kind of a selling job they are doing, and they will be able to bolster up the weak numbers, play the winners, do their buying and control their stocks from the correct merchandising principles based on actual sales.

Dealers are being informed well in advance of our merchandising plans, campaigns and monthly specials, giving them ample time to join in the sale of electrical merchandise. The policy of featuring the dealers' names in our advertising will continue to build sales for our dealer partners, and ultimately build load for the company.

During the six months of the Better Light-Better Sight campaign, the company advertised in the local newspapers, using 30-in. to 75-in. advertisements. In some cases the dealers also advertised independently. In the "free wiring" campaign just closed, any dealer who, during the 30 days of the campaign, would run two advertisements and join in the campaign, could have free wiring of any range or water heater that he sold.

The "monthly special" is also an activity which is serving to coordinate our efforts with those of the dealer. There is always one outstanding piece of merchandise at an attractive price being featured. Every dealer is invited to participate, either through personal solicitation or by letter. This idea has been bringing splendid results, and will be continued indefinitely.

The best way to build load is through dealer sales of merchandise. To bring this about, it is my idea that there must be a definite program under way at all times. Then go to the dealers and there is little difficulty experienced in getting whole-hearted cooperation.

In laying out these plans, there is one principle to be followed, and that is that whatever is done there must be an opportunity for the dealer to make a profit on the merchandise. If that factor is lacking, there can be no success.

TABLE I.

Lamp Bulb Sales			Study Lamp Sales			Reflector Type Lamp Sales			Pin-it-up Etc. Sales			Added Lighting in K.W.	
Q	C	D	Q	C	D	Q	C	D	Q	C	D	Q	Sales
109,100	54,155	234,144	2700	1521	1217	1650	995	1410	3800	2231	1676	848	1088.44
Combined (C) and (D)	288,299			2738			2405			3907			

Customers Make Use of Extra Electricity

That the "free electricity" and the "half off on extra electricity" offers of San Joaquin Light & Power Corp. and Midland Counties Public Service Corp. have brought material results to consumers and to the company, as well as to the electrical trade, have been proved by recent figures compiled.

At the end of May it was shown that during that month 2,162,028 kw.-hr. more had been used by consumers this year than for the same month last year. Since Jan. 1 consumers had used more than 7,246,370 kw.-hr. over a corresponding period last year. During May it was found that 64.5 per cent of all the consumers used an increased amount of electricity.

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• RENO ELECTRICAL CONTRACTORS and Dealers Association sponsored a Better Light-Better Sight week beginning April 22 at which Leo. G. Gianini and W. E. Carlson, of the incandescent lamp department of the General Electric Co., San Francisco, were featured at a series of lecture meetings before service clubs and Parent Teachers Association. The program culminated with a public educational lecture in the Reno High School Auditorium.

Experience Teaches How to Sell Air Conditioning

PREPARED by one year's hard experience, the San Joaquin Light & Power Corp. has worked out a program for the promotion of air conditioning this year which has all the earmarks of producing very substantial results. In brief, the program this year consists of a means whereby the power company can sift out the prospects for the cooperating manufacturers of air conditioning equipment and thus concentrate attention on the really good prospects.

George E. Zelhart, in charge of this activity for the company, reports that last year 91.75 hp. in air conditioning was sold, embodying refrigeration jobs. Two hundred buyer contacts were made, out of which 87 surveys were made. Twenty-three of the surveyed jobs were sold in 1934. Giving excellent cooperation were the General Electric Co., Frigidaire and Westinghouse. This year the York Ice Machinery Corp. and Carrier Engineering Co. have joined and set themselves up to give equally good cooperation. Many of the prospects surveyed, where the job could not be sold immediately, had ducts installed preparatory to future buying of the equipment.

Mr. Zelhart found that the general acceptance of air conditioning was in direct ratio to the pioneer work done by the power company. It was recommended therefore that more promotional work be done this year and that the activity be expanded. It was also planned to get at the promotional work much earlier.

Two main obstacles were found in practice last year. The first was the price of the equipment. The second was that it was difficult to get around to all the prospects on the first hot day of the season. In other words, delay in reaching the prospects when they felt an acute need for air conditioning caused the loss of some good business perhaps.

It was also found that there was a great deal of running around over the big system chasing up prospects who turned out to be poor prospects and not really in a position to buy. There was considerable useless travel and it was found that the prospects had no idea of the cost of the equipment.

Teach Sales Staff

The first step taken was to give all power salesmen of the company a rudimentary knowledge of air conditioning. It was not desired to make air conditioning engineers out of them or to have them specify equipment. The purpose was to teach them to know what air conditioning was and to be able to make out the survey sheets prepared by the company. Accordingly, the "climateer" course of the General Electric Co., a correspondence course, was used, all salesmen signing up. All but four completed the course.

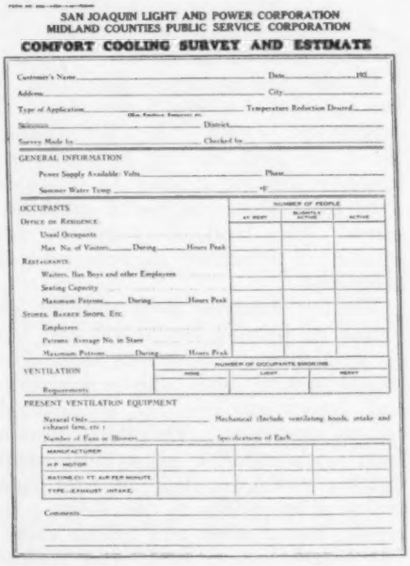
The survey chart, illustrated herewith, was especially designed to get from the prospect all pertinent information regarding conditions on the premises so that a rough estimate of cost could be worked up by the main office. It has space for listing the number of occupants, present ventilating equipment, miscellaneous sources of heat, monthly bills for the past year and heat transmission factors. The back page is squared off to facilitate making a rough diagram to scale of the premises to be conditioned.

Salesmen on contacting prospects this year fill out this rough survey sheet. It is sent to the main office and an approximate estimate of the price is worked up. The salesman is phoned the price by the main office and the prospect is contacted again. If he is still interested he is considered a real prospect and then either Mr. Zelhart or Cornell, his associate, who work exclusively on the air conditioning prospects, take a dealer with them to visit the prospect and to quote definitely on an installation. This saves mileage and time both of the dealer and of the utility. The survey sheet is kept on file so that in case a prospect does not close at the time he can be contacted later with all the facts in hand.

Mr. Zelhart found that one prevalent impression was held generally about air conditioning. When talked to, a prospect always says something like this. "Oh, I thought that there was something I could get that I could just plug in like a radio and that would cost about $60 and cool the whole house" which was always accompanied by a sweeping gesture of the hands indicating the whole of the house.

In relations with the dealers it is strictly understood that the prospect is open to all dealers, yet it has been found that those who cooperated last year obtained considerable business and those

Survey form used by power salesmen to send to the main office for a rough estimate of cost. Note the type of information obtained



SAN JOAQUIN LIGHT AND POWER CORPORATION
MIDLAND COUNTIES PUBLIC SERVICE CORPORATION

COMFORT COOLING SURVEY AND ESTIMATE

Customer's Name _____ Date _____ 193__
Address _____ City _____
Type of Application _____ Temperature Reduction Desired _____
Salesman _____ District _____
Survey Made by _____ Checked by _____

GENERAL INFORMATION
Power Supply Available: Volts _____ Phase _____
Summer Water Temp _____ °F

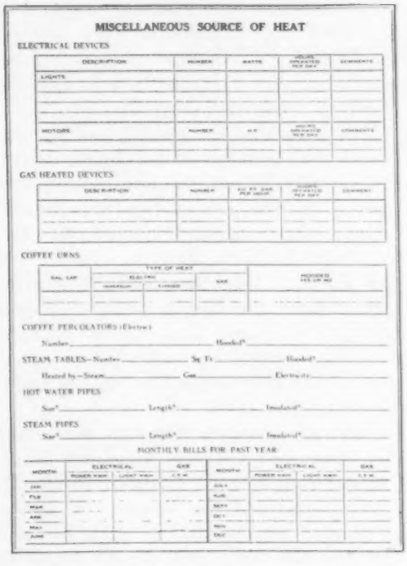
OCCUPANTS	NUMBER OF PEOPLE AT REST	SLIGHTLY ACTIVE	ACTIVE
Office or Residence			
Usual Occupants			
Max. No. of Visitors ____ During ____ Hours Peak			
Restaurants			
Waiters, Bus Boys and other Employees			
Seating Capacity			
Maximum Patrons ____ During ____ Hours Peak			
Stores, Barber Shops, Etc.			
Employees			
Patrons: Average No. in Store			
Maximum Patrons ____ During ____ Hours Peak			

VENTILATION	NUMBER OF OCCUPANTS SMOKING: NONE	LIGHT	HEAVY
Requirements			

PRESENT VENTILATION EQUIPMENT
Natural Only _____ Mechanical (Include ventilating hoods, intake and exhaust fans, etc.) _____
Number of Fans or Blowers _____ Specifications of Each _____

MANUFACTURER			
H.P. MOTOR			
RATING CU. FT. AIR PER MINUTE			
TYPE—EXHAUST INTAKE			

Comments _____



MISCELLANEOUS SOURCE OF HEAT

ELECTRICAL DEVICES

DESCRIPTION	NUMBER	WATTS	HOURS OPERATED PER DAY	COMMENTS
LIGHTS				
MOTORS	NUMBER	H.P.	HOURS OPERATED PER DAY	COMMENTS

GAS HEATED DEVICES

DESCRIPTION	NUMBER	CU. FT. GAS PER HOUR	HOURS OPERATED PER DAY	COMMENTS

COFFEE URNS

GAL. CAP.	TYPE OF HEAT: ELECTRIC (IMMERSION)	ELECTRIC (JACKETED)	GAS	PROVIDED WITH OR NO

COFFEE PERCOLATORS (Electric)
Number _____ Headed* _____
STEAM TABLES—Number _____ Sq. Ft. _____ Headed* _____
Heated by—Steam _____ Gas _____ Electricity _____
HOT WATER PIPES
Size* _____ Length* _____ Insulated* _____
STEAM PIPES
Size* _____ Length* _____ Insulated* _____

MONTHLY BILLS FOR PAST YEAR

MONTH	ELECTRICAL: POWER KWH	ELECTRICAL: LIGHT KWH	GAS: C.F.M.	MONTH	ELECTRICAL: POWER KWH	ELECTRICAL: LIGHT KWH	GAS: C.F.M.
JAN				JULY			
FEB				AUG			
MAR				SEPT			
APR				OCT			
MAY				NOV			
JUNE				DEC			

HEAT TRANSMISSION

SIDE	DIRECTION, WALL AREA, WINDOW AREA, DOOR AREA, ETC.	EXPOSURE	CONSTRUCTION, THICKNESS OF BRICK, WOOD, STUD, INSULATION, ETC.	HEAT LOSS OR GAIN TO BE ARRANGED
1	WALL			
	GLASS			
	DOORS			
2	WALL			
	GLASS			
	DOORS			
3	WALL			
	GLASS			
	DOORS			
4	WALL			
	GLASS			
	DOORS			
5	WALL			
	GLASS			
	DOORS			
6	WALL			
	GLASS			
	DOORS			
CEILING				
SKYLIGHT				
ROOF				
FLOOR				

ATTIC—Ventilated* _____ Natural* _____ Forced* _____
FLOOR—Directly on Ground _____ Ventilated* _____
NOTE—If room or building to be cooled is directly against another building, or if there is some condition which affects any wall or the floor or ceiling of the building, give complete detail of this condition below for that respective wall, floor or ceiling.
Comments _____

who decided to play a lone hand were not as effective in their sales work.

The plan has the advantage to the manufacturer and dealer that his work is concentrated on really live prospects.

In support of the program a very effective mailing piece was prepared by the advertising department. It reproduced enthusiastic letters from a variety of users of air conditioning, each of which stressed some particular benefit to his business derived from it.

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San Diego Dealers Follow Up Exposition

"MAGIC WORD" contest in conjunction with the series of fourteen 15-min. radio broadcasts over local stations formed the chief promotional follow-up of the Bureau of Radio and Electrical Appliances of San Diego County in June. The follow-up feature was to cash in on the already aroused public interest in electric refrigerators as a result of the 1935 Refrigeration Show held at the San Diego Hotel Pompeiian Room near the first of May.

The show itself was a success in every sense of the word, measured by results. An experimental course was adopted in holding the show as an open house with hourly demonstrations during a 12-hour period each day. Miss Florence Miller, hostess and demonstrator, also had a unique "television mind" reading act which attracted considerable attention. Approximately 2,500 people attended the show, yet more than 50 refrigerators were sold to prospects obtained at the show one week after it closed. Hundreds of names of prospects definitely in the market for refrigerators were secured and it was estimated that at least 150 refrigerators would be sold as the result of that promotion. A studied attempt was made to appeal only to owners or to those definitely interested, since no door prizes were advertised or given, or free samples either.

The "magic word" contest was conducted along lines similar to previous radio contests of the Bureau. The contest employed the names of the various refrigerators sold in San Diego, out of which contestants were to try to write as many words as possible, not using any letter in the name twice. Blanks were available at refrigerator dealers and the prizes offered were season ticket books to the exposition, with concession tickets as consolation prizes.

Another activity undertaken under the leadership of J. Clark Chamberlain, secretary-manager, was a series of meetings of refrigerator dealers to work out ways and means to curb voluntarily unbusinesslike practices, chiefly promiscuous discounting and trade-ins. A committee was appointed and an agreement suitable to dealers was finally reached. This agreement was to be signed. One copy of the document was to be framed or otherwise preserved for use in his own establishment by the dealer and the other filed in the office of the Bureau.

It was further agreed to hold twice monthly luncheon meetings of refrigerator dealers and distributors for the purpose of discussing other mutual problems and stimulating refrigeration business generally.

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Contractors Sponsor San Jose Lighting School

DETERMINED to bring themselves up to date with the latest developments in lighting so as to cash in on the greatly aroused national interest in Better Light-Better Sight, the electrical contractors of Santa Clara County sponsored and participated in an educational course in modern illumination on seven successive Tuesday nights ending May 28. Meetings were held at the Chamber of Commerce in San Jose, beginning April 16, and each Tuesday night at 8:00 until May 28.

Realizing that the public had become awakened to the need for better illumination, the electrical contractors met with W. E. Carlson, of the Incandescent Lamp Department, General Electric Co., and William Bowler, Pacific Gas and Electric Co., San Jose, to outline a procedure for such a course. It was felt that the best interests of lighting would be served best with the cooperation of all representatives of the lighting profession.

First negotiations came as the result of a meeting in March, at which W. E. Carlson and Leo G. Gianini, of the G. E. Co., outlined the science of seeing as a new conception of lighting and just exactly what this would mean in terms of greater sales to the electrical contractor-dealer. Leo Gianini, due to his wide field experience and because of his illumination courses conducted at Stanford University, was asked to arrange the program. Mr. Gianini arranged the meetings in cooperation with Carl O. Martin, Benjamin Electric & Manufacturing Co.; Clark Baker, Sr., Pacific Coast Electrical Bureau; A. T. Bergeron, The Miller Co.; Fred Wellhouse, Westinghouse Electric & Manufacturing Co.; Robert G. Dummel, Holophane Co., Inc.; W. J. Delehanty, General Electric Co. and Dr. Leland H. Brown, of Stanford University. The final conference on May 28 was held at the Illumination Testing Laboratory at Stanford University under Dr. Brown's direction. At this time practical demonstration of the value of higher intensities in office lighting were made. An office was lighted to an intensity of from 75 to 100 foot-candles which illustrated dramatically the necessity for such levels of illumination.

The last session of the lighting school was held at Stanford University lighting laboratories

In the preliminary negotiations it was agreed that at least fifteen electrical contractors would take the course. When the first meeting was held attendance was 50, at least 35 of which were from contractor-dealer establishments. This level of attendance was maintained throughout the remainder of the course.

The first program dealt with the selection of lighting equipment and latest developments in various lines. The second session dealt with new simplified layout manuals for solution of typical problems. The third session dealt with solution of typical shop lighting problems such as fruit canneries, printing layouts, laundries, auto repair shops, wash and grease racks. The fourth session dealt with typical

store and office lighting problems. The fifth session dealt with outdoor lighting for recreational purposes. Session No. 6 was devoted to in-built lighting in its application to lodge rooms, dining rooms, bars, stores, hotel lobbies, etc. The last session was devoted to analyzing equipment manufacturers' claims by test at the Stanford testing laboratory, as previously described.

As a result of these lighting classes it is confidentally expected that the levels of illumination will be much improved in the Santa Clara region and that contractors will derive many wiring installations as the result.

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Sell Selves Good Light; Then Sell Customers

IN the belief that good lighting, like everything else, begins at home, the home lighting campaign of Puget Sound Power & Light Co. has been arranged upon that sound basis. In other words, the first job was that of selling the employees of the company, and electrical dealers too, upon the need for good home illumination and the means to obtain it. This was done prior to the installation of a home lighting department, consisting of a group of trained women lighting representatives who called at the homes of people in the company's system by appointment to demonstrate the amount of light needed in any location in the home.

Likewise, in support of the activity, an intensive advertising campaign was developed by the Strang & Prosser Advertising Agency of the company, utilizing newspapers, radio and direct mail to introduce the new service to customers of the company. Dealers in electrical goods, department stores, furniture stores and hardware stores were contacted and encouraged not only to carry the I.E.S. approved merchandise but also to tie-in with advertising.

A shopping tour by the girls who were to contact the public was made to all the dealers, wholesalers and manufacturers interested in home lighting equipment. This gave them an opportunity to become acquainted with dealers and dealer stocks and also to talk the lighting program over with the dealers. A direct mail program to the dealers advising them of the department, about the I.E.S. approved lamps, and of the advertising schedule was also used effectively.

Customers are being referred by the girls to the various dealers, depending upon with whom they desire to trade, and with reference to the availability of lighting equipment needed in the home.

A tie-in was made with optometrists and eye specialists offering the services of the demonstrators to the optometrists as a means by which they could assure their patients the ability to enjoy complete satisfaction from eye corrections prescribed in spectacles.

The employee end of the campaign was most interesting. It consisted of meetings, a letter writing contest on "What Better Lighting Means in My Home" with I.E.S. lamps as prizes, and demonstrations of the equipment and of the work of the new department. Demonstrations in employees' homes have been arranged for the majority of employees. As a result of this trial use of I.E.S. lamps 53.5 per cent of the initial home lighting calls to customers came as a result of employee leads.

The lighting program is one of the company "trail blazing" efforts to bring "the abundant light" to its customers by means of abundant electricity.

DEALER SALES REPORTS—APRIL-MAY, 1935

A Summary of the Dealer Reports Compiled by Associations, Societies, or Bureaus, or Dealer Contact Departments of Utilities

APPLIANCE	P. G & E. Co.[1]		San Diego Cons. G. & E. Co.[2]		San Joaquin Lt. & P. Corp.[3]		So. Calif. Edison Co., Ltd.[4]		Utah Power & Lt. Co.[5]		Wash. Water Power Co.[6]		Idaho Power Co.[7]	
	*April 1935	5 Mos. Dec.-April	May 1935	Year to date	May 1935	Year to date	May 1935	Year to date	*April 1935	Year to date	May 1935	Year to date	*April 1935	Year to date
Ranges	124	493	36	111	166	677	601	2,386	239	637	42	193	420	998
Water Heaters	35	161	62	187	60	323	314	1,375	345	78	12	79	.....	.....
Air Heaters—aux.	133	2,047	21	505	1	52	67	557	7	98	57	275	3	74
Air Heaters, 220	36	242	.....	.....	22	292	.....	.....	.....	.....	.....	.....	.....	.....
Refrigerators	3,431	9,814	309	1,570	1,104	2,808	4,247	11,738	749	1,612	808	2,502	467	1,102
Dishwashers	6	31	.....	.....	4	10	.....	.....	.....	1	.....	.....	.....	2
Washers	2,032	10,340	255	1,059	270	1,461	2,486	11,228	650	2,813	392	1,749	331	1,559
Ironers	531	3,059	36	180	70	239	349	1,635	28	116	36	157	21	161
Vac. Cleaners	1,862	8,836	117	590	87	414	783	4,186	498	1,821	161	878	86	349
Radios	5,423	28,992	624	3,874	280	2,066	3,528	18,948	571	3,098	492	3,043	215	1,294
Mixers	412	1,450	126	306	89	391	457	1,533	93	749	93	384	21	143
Cookers, Caseroles	.....	.....	15	82	18	76	64	193	17	33	233	970	.....	3
Irons	.....	.....	288	1,141	321	1,464	1,483	5,984	621	2,522	453	2,033	231	1,074
Waffle Irons	.....	.....	110	642	85	501	457	1,899	169	728	135	656	42	381
Toasters	.....	.....	169	901	101	556	706	2,708	307	1,275	363	1,804	84	424
Table Stoves, etc	.....	.....	19	238	97	512	302	1,217	376	1,745	.....	.....	133	471
Heating Pads	.....	.....	32	342	.....	.....	160	1,032	91	555	95	451	12	131
Curling Irons	.....	.....	.....	.....	.....	.....	69	319	208	711	.....	.....	.....	.....
Coffee Makers	.....	.....	121	547	82	452	364	1,599	164	509	342	1,343	66	385
Sewing Machines	1,403	5,811	19	79	.....	.....	.....	.....	.....	.....	73	351	.....	.....
Clocks	.....	.....	.....	.....	74	443	348	1,797	172	672	332	1,202	9	111
Fans	.....	.....	.....	.....	.....	.....	254	362	13	29	24	54	6	36
Floor Polishers	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sun Lamps	.....	.....	.....	.....	.....	14	36	152	8	38	1	19	8	99
Reflector Lamps	.....	.....	.....	.....	86	434	.....	.....	1,638	.....	141	383	128	669
Misc. Lamps	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,422	5,987	259	2,089
Yard Lights	.....	.....	.....	.....	42	197	.....	.....	.....	.....	.....	.....	.....	.....
Misc. Small Appl.	.....	.....	220	1,133	144	685	550	2,200	4	.....	.....	.....	.....	.....
Total Dealers	.....	1,400	.....	.....	.....	.....	573	573	.....	.....	.....	.....	.....	.....
No. Reporting	.....	.....	.....	.....	105	112†	527	516†	.....	243†	.....	.....	.....	.....

* May Report was not available at time of going to press. † Arithmetical average number of dealers reporting since first of the year.

[1] P. G. and E. reports obtained only on major appliances upon which accurate reports are available from dealers' accounts. Total dealers include gas as well as electric dealers. First report of year 1935 starts with Dec., 1934 and will be cumulative from that month.

[2] Gathered by Bureau of Radio and Electric Appliances of San Diego County. Clocks, fans included under miscellaneous.

[3] Includes dealer reports from Midland Counties Public Service Corp. territory also. Compiled by Valley Electrical Supply Co.

[4] Includes reports from dealers on San Joaquin Valley system of the company as well as Southern California areas served. Comparative figures of same month last year indicates improvement.

[5] Includes Utah Power & Light Co. territory in Utah, Idaho and Wyoming. Also Western Colorado Power Co. territory.

[6] Dealer sales only for Spokane and company's territory. Company sales not included. Table stoves, grills included with cookers.

[7] Figures compiled by Electrical Equipment Sales Association.

In the Realm of Science + + +

[Devoted to the research and scientific developments which affect the electrical industry and which are being carried on in the engineering departments of Western universities. Edited this month by J. Hugo Johnson, head of the Electrical Engineering Dept., University of Idaho]

Utility Taxation—The Forgotten Problem

By CLEMENT STREIFUS
University of Idaho

TAXATION is one of the difficult problems of the day, and it is evident from the present tendency of the state and federal governments that something will have to be done to reduce the taxes or there will have to be a more equitable distribution of the taxes between the private utilities who pay a high tax and the municipal systems who pay little or no tax.

Municipal systems are practically tax free by virtue of state and federal laws which exempt them from taxation. However, in Washington, the municipal systems pay a small 3 per cent tax on gross revenue and the city of Seattle pays 6 per cent. These taxes are very small compared with the taxes paid by the private utilities.

In the constitutions which were framed and adopted in the states of Washington and Idaho relating to revenue and taxation provided that the Legislature shall provide by statute a uniform and equal rate of assessment and taxation on all property according to its value in money, but they provided exemption of the payment of taxes on federal, state and county property and municipal systems. It is evident from the following facts that these framers of the constitutions had no conception of the enormous amount of municipal property which would be eliminated from the tax rolls by virtue of these exemptions.

The amount of tax free property in Washington is enormous, and because of the fact that it is tax free, it is a detriment to the state. The situation in Idaho is of a similar nature, but not as extensive as it might be.

Municipal systems in Idaho pay no taxes whatsoever, but yet make many preposterous claims about their municipal systems even though they do not operate on the same basis as the private systems who pay some of the highest tax rates in the country, and who are thus sharing more than their just proportion of the tax burden. The municipal systems which confine their services to a small portion of the country should be taxed the same as the private systems. There is no just basis for the selfish attitude that "municipals" should not be taxed and they should assume the responsibility of sharing their portion of the tax burden, as do the other towns in the state which pay for the services of the tax-paying private utilities. It is not fair that the people in the rest of the state should pay the taxes which are not paid by the municipal systems. The amount that these systems would pay were they taxed the same as the private systems is enormous and will be discussed later. The fact that the people in the rest of the state pay these taxes is a situation which should be altered.

From a study of the taxes paid by two prominent private utilities in Washington and Idaho, taxes that should be paid by the municipal systems (were they taxable as are the private systems) can be obtained. Some very comprehensive and reliable data were obtained on this subject and these very conservative figures will give an idea as to the tax exempt situation relative to the municipal systems in Idaho and Washington.

The largest municipal system in Washington is that owned by the city of Seattle, valued at about $50,000,000. With the exception of a small 6 per cent tax, the entire electric power system of the city of Seattle is exempt from taxation. The Puget Sound Power & Light Co., which operates in that district, pays a large tax to the counties, state and federal governments, and in so doing pays more than its just share of the taxes. But yet the city of Seattle pays little taxes and the electric power rates as paid to it are very little different from the private power systems in that district. A conservative figure for the amount of taxes the city of Seattle would pay were it taxed the same as the private system, would be about $800,000. This tax would go to support the county, state and federal governments as do those taxes paid by the private systems.

Because the Seattle system is exempt from taxation one might think that its rates would be a great deal less than those charged by the private companies, but a report by the Federal Power Commission shows that the rates of the Seattle system in the smaller blocks of power are higher than those charged by the Washington Water Power Co., although the rates in the larger blocks of power are less. In other words, the small users of the electric power, or the residential customer, has to pay higher rates than those obtaining the same service from the Washington Water Power Co.

The city of Tacoma has a municipal power system which is classed as one of the most efficient and best operated municipal systems in the United States. A study of the rates charged by that city showed that they were lower in every case than those charged by the private systems, *but* on further examination it was noted that if the city of Tacoma should pay the taxes that the private systems do in proportion to total income, it would be necessary for Tacoma to raise its rates to almost the same as the private utilities.

Since the Seattle power system and the other municipal systems do pay a small 6 per cent gross revenue tax, it would be interesting to compare this small tax rate with the taxes and tax rate of the Washington Water Power Co. The following is a list of taxes and the amounts paid by the Washington Water Power Co. in 1933:

Real and personal property	$498,650
Occupational 3 per cent	134,935
Regulatory fees	5,150
Spokane 3 per cent	71,200
State water rights	5,249
Corporation license	293
City franchise	2,522
Electrician license and bonds	20
Idaho income tax	12,000
Idaho kw.-hr.	2,415
Miscellaneous	6,350
Federal income	111,820
Capital stock	9,420
Federal energy	98,000
Federal water right	16,890
1933—Total	$958,055

Since the gross revenue of the Washington Water Power Co. in 1933 was $6,615,857, then per cent of income which goes for taxes is 17 per cent.

The Washington State Legislature at the recent session has just imposed an-

other 3 per cent tax on the private utilities in Washington which brings the total percentage up to 20 per cent of gross revenue. This is not the tax on the income but on the gross revenue. No other industry has to pay as high a tax rate in proportion to its gross income as that. No company can pay this high a tax rate without affecting the salaries of its employees and hence the employees are helping to pay the taxes.

Suppose the city of Seattle were taxed, some would say that they were doing nothing but taking the money out of one pocket and putting it into another, but the taxes paid by the people in Seattle are just the same as any others; so the people in Seattle are not only paying the electric power bill at approximately the same rate as those under private utilities, but they are not realizing any return in the form of benefits from the taxes which they would if a private system were operating in Seattle and paying taxes. Since the income from power sales is the same for the city of Seattle in proportion to power sold, one wonders where the money is spent. The following is a summary of the Seattle system valuation, income from 1933 and the corresponding expenditures:

Actual valuation of the system	$43,000,000
Bonded indebtedness	31,000,000
Gross revenue—1933	4,940,905
Expenses	1,839,234
Interest	1,500,606
Depreciation	1,417,145
Surplus	183,919

It is evident from the above tabulation where the money is spent that is taken in from the sale of the electric power. It is also noted that the bonded indebtedness of the system is almost three-fourths of the valuation. This enormous bonded indebtedness makes it necessary to pay almost 30 per cent of the gross income as interest on the bonds. The point to bring out here is that should the city of Seattle have to pay the $800,000 tax bill where would it raise this sum? From the expenditures, it is seen that she would not be able to pay this tax without a radical change in operations, increasing rates or by extending the time of retirement of the bonds from 31 years to a longer period. How is it that the private utilities are able to pay taxes and yet operate their system on the same rates charged by the municipal systems?

Of interest is the amount of taxes that the other municipal systems would pay were they taxed the same as the private systems. The following list of the cities and towns in the state of Washington which have in whole or in part their own municipal power systems gives the amount of taxes these cities would have to pay if they were taxed the same as the Washington Water Power Co. and the Puget Sound Power & Light Co.

Seattle	$ 819,000
Tacoma	321,817
Centralia	20,040
Port Angeles	18,477
Ellensburg	17,134
Cashmere	9,004
Cheney	8,315
Blaine	3,565
Chewelah	2,404
Waterville	1,907
Sumas	1,351
Eatonville	1,094
Total	$1,224,310

On summing up the taxes that should be paid by these cities it is found that the large sum of $1,224,310 would be paid to the county, state and federal governments. One might say that the total population of these cities is a great portion of the population of the state and hence should have little effect on the operations in the rest of the state.

Tax Municipal Operations on the Same Basis as the Private Companies and Distribute the Tax Burden Equitably, Lower the Consumer's Power Bills and Eliminate the "Flexible" Yardstick in Measuring Utility Efficiency

This is not logical or fair as the people in the above-mentioned towns pay the same taxes that the others pay and still pay the same power bill which in turn does not add to the tax coffers of the state.

While this situation prevails in Idaho it is not as evident as in Washington. However, if the municipal systems in Idaho had to pay taxes, the amount paid by them would be a greater per cent of their gross revenue than that in the state of Washington.

In Idaho taxation of the private utilities is very unfair as they are sharing more than their just portion of the taxes in this state. The high taxes paid by one company not only have caused the company much grief, but also vitally affected the workers who are wage earners. It is the old story that the consumers or the workers in the companies pay the tax bill no matter who is taxed or how the tax is applied because the consumer pays the electric power bill and the employees receive the wage cuts or are affected in other ways.

The following is the total revenue for a well known company in Idaho and the taxes paid by that company in 1933.

Total revenue	$3,798,798
Taxes	816,655
Taxes paid in per cent of gross revenue	22 per cent

It has been said that this is one of the highest tax rates on basis of gross revenue paid by any utility. It is evident that no utility can pay this high a tax rate without affecting the wages of its employees and affecting the electric power rates charged by it. This company has tried to lower its rates, but its taxes have been on the increase so this has been difficult; hence, the consumer of the electric power pays the taxes because he does not enjoy lower rates.

Is it not time, then, that some thought be given to lowering taxes? Lowering taxes on the private systems and properly taxing the municipal systems would greatly reduce the power rates and hence the customer would be aided.

The kilowatt-hour tax bill now in effect here in Idaho places a tax of one-half mill on each kilowatt-hour of electricity generated in Idaho on private but not on municipal operations. It came at a time when the companies were doing everything possible to keep men employed as unemployment was on the increase. When this sudden tax was placed on a prominent private utility in Idaho, that company laid off about 150 men within the next few months whose total income was about $175,000 per year or an amount approximating the kilowatt-hour tax for one year. These very men were taxpayers in the state of Idaho and were drawing a legitimate wage from a progressive company. Now that they had been laid off and their income stopped, it is seen that the workmen were paying the kilowatt-hour tax bill. In like manner, the consumers were paying the kilowatt-hour tax because the company was contemplating a reduction of rates, which it could not do upon application of the tax.

In view of all these things just discussed, (1) non-taxing of the municipal systems, (2) high taxes paid by the private systems, (3) underrated salaries of the employees, (4) decreased payrolls and (5) allowing the rest of the state paying for taxes which the municipal should pay, there should be a more even distribution of the tax burden by taxing the municipal systems and thus placing them on an equitable basis with the private systems. They then will have no reason for making a great number of false assertions which in turn place the private companies in a poor light with the public. This dissention toward the private companies places the employees in an embarrassing position because people will place them in the same light as they think of the companies as a whole. The wrong public attitude is detrimental to the proper operation of any company.

Advocating neither private nor municipal ownership, it is only fair to place these two types of systems on the same basis. A flexible "yardstick" isn't much help to an overtaxed consumer.

Standardization Leads to Distribution Economies

By F. S. BENSON
Asst. Electrical Engineer, Pacific Gas & Electric Co., San Francisco, Calif.

THERE is no royal road to lower such costs nor can a magic wand be waved to instantaneously reduce all the distribution costs. It is a slow uphill battle because so much distribution equipment and related facilities are already installed in the field and are working, that economies can only be made slowly with existing facilities, but extensions and new facilities should be installed by the methods outlined in this paper. The longer the delay, the slower will be lowering of the total system distribution costs.

The problem can be classified under two headings:

1. The policy of the management of the company.
2. The changes in the art of the distribution of electrical energy. The solution proposed is general to all companies, the writer having no one particular company in mind.

The Policy of the Management

The coordination and cooperation of several departments are required to properly solve this problem. The functions of each department involved should be clearly set forth and each department perform its own duties and not attempt functions that are not assigned to it.

The departments involved are as follows:

(a) Engineering
(b) Purchasing and Warehousing
(c) Operating and Construction

(a) Engineering Department

The Engineering Department should prepare and issue standards for all classes of distribution equipment and materials including poles, hardware, cross-arms, insulators, wire, cables, potheads, etc. They should be called company standards.

These standards should comply with the regulations of State Railroad Commission and other state political bodies having jurisdiction and shall also conform with the best practices as agreed at meetings with representatives of the company's operating department. All testing of distribution material and equipment should be done by the Engineering Department and a periodical check made at definite intervals on purchased materials to be certain that they comply with the company's standards.

(b) Purchasing Department

The Purchasing Department should be authorized to purchase only materials listed in the company's standards and such material only should be kept in stock. There is no justifiable reason for a multiplicity of similar materials not standard to be purchased and stocked. Adherence to this policy will reduce the number of small leaks that undoubtedly cost the company considerable money during a year's time. Warehousing costs will be reduced due to the lesser number of materials carried in stock all over the system.

Distribution Costs

Second Prize Answer to the Question: "How Can the Cost of Electric Distribution Be Lowered?"

Only the highest grades of materials should be purchased, although the first cost may be a little higher than "jerry" material, the annual cost to the company will be materially less. Such suggestions as buying crooked, knotty poles, substituting iron wire for copper, etc., are definitely wrong as the annual cost to company will be increased, in addition to the reaction of the general public to such a procedure.

(c) Operation Department

The Operating Department should construct all lines and install all material and eqiupment as instructed by the company's standards. Individual representatives of this department should not be encouraged to install or construct distribution facilities with material or equipment that is not standard. A rigid engineering design should be followed in all cases and all facilities installed in all parts of the system should have similar construction. Rugged individualism has no place if low cost distribution facilities are demanded.

The management must have confidence in the capability of the personnel of its various departments and therefore enforce such rules as will limit to a minimum the overlapping of duties and responsibilities of the several departments.

Changes in the Art of Electric Distribution

The changes in the art of electric distribution will be discussed under the following sub-titles.

(a) Zone type substations.
(b) Primary distribution system design.
(c) Secondary distribution system design.
(d) Distribution transformers.
(e) Voltage regulation.
(f) Merchandising of electric appliances as affecting overall cost of distribution facilities.

These subjects have a very definite bearing upon distribution system costs. There are new ideas proposed, which may appear radical to the reader; however, the hope of lower distribution costs lie in such directions and undoubtedly many changes or even abolishment of existing practices must be made in order to arrive at a desired goal.

(a) Zone Substations

Urban substations usually require much property and building space which may not be fully developed or occupied for a number of years. The annual carrying charge on such property and building space is considerable and distribution accounts are burdened with this expense.

The present distribution substations, especially urban, are quite large and very expensive. As the density of the domestic load grows, instead of increasing the facilities at the large urban substations, an underground zone station should be installed at the load center of the particular feeder to be relieved. Such a zone station is fed at high voltage (12 kv) from the main stepdown station and has an installed transformer capacity from 1000 to 2000 kva. Single phase transformers equipped with load ratio control should be

used, thus giving as good a regulation as possible to the area by the voltage regulating methods now used.

Such zone stations have many advantages which are as follows:

1. No additional property required as these stations are located in the streets. Franchises give the legal right to build manholes in the streets.

2. Minimum of first cost, as only small increments of station capacity are added when required. Estimated cost of such stations varies from $11 to $13 per installed kva.

3. Reduction of spare station equipment, no spare capacity installed. Too much capital is now tied up in spare station equipment, which again burdens the distribution accounts.

4. Reduced operating expense as these stations are fully automatic, that is, shifting load from one supply line to the other. Two 12-kv. lines are required to give good service and automatic reclosing on the 4-kv. or low voltage lines.

5. The 12-kv. lines supplying the zone station can be used to supply other loads making a more complete use of the 12-kv. facilities.

6. These small stations are quickly installed and a few standard designs will serve for a long time, thus reducing engineering design expense and greatly reducing construction cost.

7. Better service to the customer as a failure of station equipment only involves customers in a limited area.

8. Allows the use of "spot" network equipment for large office building or apartments while still using the existing radial distribution facilities for the less densely scattered loads, where a secondary network system is entirely too expensive in first cost.

(b) Primary Distribution System Design

Studies have been made of distribution systems of different voltages such as 4- and 12-kv. giving the annual cost in relation to average installed transformer capacity. The results of these studies clearly show some voltages are uneconomical for certain load densities. The recommendations are as follows:

1. Industrial loads should be supplied by 12-kv. feeders, preferably feeders having voltage regulators at the substation.

2. Residential and commercial loads should be fed by 12-kv. feeders when the average installed transformer rating in the area under consideration exceeds 25 kva.

3. Residential and commercial loads should be fed from 4-kv. feeders when the average installed transformer rating in the area under consideration is less than 25 kva.

4. Zone substations of low capacity, say 1500 kva., 12/4-kv., located at the load center of a 4-kv. radial distribution system reduces the annual cost of such a distribution system, so that it is more economical to serve that area at 4 kv. than 12 kv. when the average installed transformer capacity in the area under discussion is 32 kva. or less.

All costs used in these studies include substation facilities with feeder regulators, poles, hardware, wires, transformers, and fuses, ducts and cables but no secondary wires, crossarms, services or watthour meters.

5. Secondary networks are not economical except in new areas where no distribution facilities exist. This statement does not apply to very dense loads such as new buildings, here the "spot" network is the correct system to use. The above statement is only true provided the radial system is well designed and has but few failures per year. This is usually the case with all companies.

(c) Secondary Distribution System Design

The use of present distribution facilitiese is limited by the voltage regulation to the customer. It is only by a complete engineering analysis that good regulation with the least cost can materialize. Mr. R. C. Powell has published in the periodical "Electric Light and Power" in April, 1927, a paper entitled "Distribution Transformer Loading and Spacing," which gives a complete mathematical analysis of the economical size of secondary copper in relation to transformer size and spacing. This is an exceedingly valuable paper that has not been given its proper place in literature of distribution facility design. The distribution engineers should thoroughly acquaint themselves with this powerful analytical tool available to them for assisting in solving their distribution problems.

Studies made of secondary systems show a variety of wire sizes used, a great variation in the numbers of customers (of the same classes) fed from transformers of the same rating. The secondary system properly engineered and installed will certainly reduce distribution costs.

(d) Distribution Transformers

Considerable saving can be made by standardizing the size of transformers used and carried in stock. Every improvement of the art of transformer design should be utilized by the company. Transformers should be bought with primary winding taps, with lightning and surge gaps, with low radio interference and having a high grade iron to give as low a core loss as possible.

The Engineering Department can save money for the company by supplying data for the rehabilitation of old transformers returned to the warehouse. Such transformers often have excessive radio interference and can be rebuilt and returned to service. This procedure tends to reduce distribution costs.

(e) Voltage Regulation

The primary distribution lines, voltages of 4-, 6.9-, and 12-kv. in urban territory are now regulated at the substation with either bus regulators or individual line regulators. By the term regulators, is meant any device for raising or lowering the line voltage excluding generating equipment. The result of such methods of regulation are a different value of voltage regulation all along the primary line. At only one place on the line or feeder is the voltage regulation at the value desired; at all other points along the line it is a compromise. With the increasing use of motor driven loads in the home, such as refrigerators, dish washing equipment, etc., and such heavy loads as ranges, water heaters and space heating equipment, the present method of regulation is becoming more and more ineffective. As the cost of regulation is increasing, the feeder loads must be limited, the size of the copper conductors increased, and the area supplied by a feeder limited by voltage regulation instead of the load the facilities can safely carry. Better voltage regulation in a given area may mean the installation of a pole-type regulator or possibly a new feeder out of the substation at considerable expense. The solution to this part of the problem is the design of a small domestic voltage regulator to be installed in the home as part of the electrical equipment that the future customer will install. This regulator must be an electronic-actuated device using the principle of a d.c. saturated core reactor in connection with an auto-transformer. Such device has not been made specifically for the domestic customer but have been made for other commercial uses, though not exactly in the type mentioned. In general, the regulating equipment should be at the distribution panel in the domestic customer's residence instead of being installed at the substation thousands of feet away. With such a device installed in the home, low voltage troubles will be eliminated, flicker reduced to a minimum and the present distribution facilities, such as transformers and wires can be greatly overloaded for short periods of time, considerably increasing the "*use*" *factor* of the distribution system.

The overall cost of the distribution system will again be reduced by increasing the number of kilowatt-hours sold in any existing primary feeder area.

(f) Merchandising of Electric Appliances As Affecting Overall Cost of Distribution Facilities

It seems to the writer that the Commercial Department should cooperate much closer with the Operating Department while selling ranges, water heaters, etc. To obtain a better "*use*" factor, we must increase the destiny of the domestic load. Distribution studies made of the primary and secondary systems show that the total overall cost of these systems is not greatly increased by the addition of range and water heater loads, where one or two electric ranges are already connected to a particular secondary circuit. The increase in cost of distribution facilities to serve additional ranges and water heaters in such cases is very low. The writer therefore proposes to modify the method of selling this equipment. Instead of waiting for prospective range and water heater purchasers to come to the office, the salesmen should obtain from the Operating Department the secondary circuits already having electric ranges connected thereto and visit these locations attempting to interest the people in adjacent homes in the purchase of such equipments. All possible inducements should be given, such as low range wiring cost, long term purchases, etc. Such loads can be taken on our system at a minimum cost to the company and the increase in revenue would more than justify the additional time and labor to sell the electric appliances under this method. This is not to be construed to mean the abandonment of the pursuit of new business, but only to intensify the selling of electric equipment to sections where the cost necessary to serve this equipment will be but slightly increased.

A Service Bureau for Customer Complaints

By W. N. LINDBLAD
Pacific Gas and Electric Co., Bureau of Tests and Inspection, Emeryville, Calif.

Free Service
Second Prize Answer to the Problem: "How Much Free Repair and Maintenance Service Can and Should the Power Company Give Its Customers?"

THIS paper proposes: first, that the power company should maintain no free service beyond the meter or service entrance of the consumer; second, that a separately organized company or bureau, with branches in cities and towns having electric service, and subsidized, if necessary, by the utilities and major appliance dealers, be formed to handle fuse replacement and appliance repair at a cost as reasonable as is compatible with good service.

The magical word "free" has long been used as bait to the American people. Hucksters, patent medicine men and unscrupulous advertisers have used it as a ballyhoo to entice the unthinking into their particular lair. Because of past experience, people are more and more recognizing the fact that the cheapest goods and the best, in the long run, are those for which a legitimate price is charged with no special "free" inducements thrown in. Certainly no thinking person will believe that the cost of the "free" leader is not included in the selling price of the finished article. Particularly is this true in the utility industry where we pride ourselves on rates based on the cost of service, and where appliance repair and maintenance are included in operating costs.

Free service tends to foster extravagant use of the service, as a result operating costs are increased, rate reductions (for which the public are clamoring), are delayed, and the large mass of consumers are discriminated against in favor of the few, who, partly through carelessness or the use of cheap, unsatisfactory appliances, make more than a fair use of the maintenance service.

The cost of this so-called free service is gradually increasing. Sooner or later a halt will have to be called in order to satisfy a demand for lower rates. The difficulties of discontinuing such a practice increases with its extent and the length of time it has been in use. There is a tendency to confuse "electricity service" with "appliance service" and particularly is this true where the utility maintains the appliances. Consequently the utility is blamed for interruptions which arise out of defective wiring and appliances over which it has no control.

Utilities in general hesitate to advertise competent repair service, feeling, no doubt, that too great a use will be made of it. The result is that many customers are unaware of it and do not benefit from the service even though the cost thereof is included in their monthly bill. The practice of free service by the utility has generated distrust among the small contractors and repair men, where a maximum of co-operation is desirable.

Damage suits are frequently instituted against utilities for accidents caused by defective consumers' equipment, principally because of the utilities' capacity to pay. In maintaining consumers' appliances without charge, there is great danger that the legal responsibility will be greatly increased in the eyes of the public and the courts.

There are only two easily recognized and well defined limits for free service by the utility. One of these is at the service entrance or meter. Beyond that there is no natural limit until a condition is reached where the utility owns and maintains all appliances and wiring and rents them to the customer. Such a system is feasible for a telephone utility where the only required appliances is the telephone instrument, but it is neither feasible, desirable, nor economical for an electric power, gas or water utility.

The Method

It is the writer's opinion that the objections that have been listed can be eliminated or greatly minimized by the formation, with the co-operation of power utilities and appliance dealers, of a corporation, committee or bureau dedicated to the proper repair, maintenance and general servicing of consumers' appliances and wiring. The name of this organization should convey in the fullest sense, the purpose for which it is formed; for example, "Consumers Electric Service Bureau" or any equally descriptive name. Branch offices should be established in the various cities and towns where electricity is served. In smaller communities, in order to inspire confidence, some established contractor or repair man might be appointed the agent of the Bureau.

At the head of this organization should be a man well schooled in public relations and of recognized executive and technical ability. The employees should be skilled in repair work as well as having had experience in contacting the public. For this reason it might be well to employ former utility employees of known experience and having the knack of favorably con-

tacting the consumers. Charges for service should be moderate and should cover labor and material costs except for certain minor and frequently recurring services such as fuse replacements where a flat charge of twenty-five or fifty cents should be made.

Contributions, in the name of increased and satisfactory use of electricity, might be made by the Pacific Coast Electrical Association and the appliance dealers association to cover part of the administration, overhead and advertising costs of the Bureau. Complaints of defective wiring, appliances or fuses could be referred by the utility to the Bureau, every attempt being made to acquaint the consumer with the aims and object of the Bureau. Space should be provided in the utility advertising to help bring the Bureau before the public.

Those appliance dealers who so desired might assign the service work on newly sold appliances to the Bureau, thereby relieving themselves of the burden of maintaining their own repair departments. Data on the weaknesses of various appliances might be collected by the administration offices of the Bureau, to be confidentially transmitted to the manufacturers involved, with a view of improving the quality of electricity consuming devices.

The Bureau should maintain a twenty-four hour service. In rural territories, where calls are infrequent and distances great, arrangements might be made with the utility to handle night emergency calls with their regular crews and make charges comparable to those made by the Bureau. The inauguration of this service and the abolition of free service would undoubtedly give rise to some opposition from certain consumers. This effect could be largely eliminated and a favorable reaction substituted if the Service Bureau could be announced coincidentally with a reduction in rates. Now is the phsycologically correct time to announce a rate reduction and this is a way of accomplishing at least a part of it satisfactorily.

Voltage Regulation—A Revenue Producer

By FRANK H. STREIT
Los Angeles Gas and Electric Corp.

PRIMARY feeder circuit voltage control as a revenue producer, holds many and large possibilities. The fact is especially true in the cases of feeder circuits on which the load is composed mainly of lighting, constant voltage of a given value at the lamp socket being desirable. Operating conditions impose many limiting factors on the problem of realizing straight-line voltage control at the point of usage. The closer the condition of constant lamp socket voltage under all load conditions can be approached, the more nearly the maximum revenue for the load can be derived.

The practice of voltage-checking urban feeder circuits, such as D-1 (page 33, Electrical West, December 1933) was to make primary checks at a point such as Fourth and D Sts., a load center, and then check towards the ends of the sub-laterals. Graphic voltmeters were used and a period of 48 to 72 hours observed. In many cases where the primary wire lengths from the load center to the end of the sub-laterals were relative short, the load center check was considered sufficient.

Voltage checked on the primary is subject to projection to the customers main switch. Therefore it is necessary to make an estimate of the average load on the primary laterals, the distribution transformers, the secondaries and the customers' services in order to arrive at a value of main switch voltage. Unless some time is taken to ascertain the above load conditions, estimates are open to considerable error. It is felt, therefore, that for good voltage control some test points should be established as near the point of usage as could be economically justified by the results obtained; i. e., the lamp socket.

Consider a circuit such as D-1, with wire sizes, spacings and lengths, average transformer sizes and secondaries as exhibited. Under maximum load of 1200 to 1400 kva. at a power factor of 90 to 95 per cent, this circuit would have approximately ten per cent regulation from the substation feeder terminals to the customers main switch. Half of this regulation occurs in the main feeder from the substation to the load center. Approximately 7 per cent occurs in the laterals and sub-laterals; 18 per cent in the transformers; 20 to 22 per cent in the secondaries; and 3 to 5 per cent in the services and extensions. Of the total regulation that occurs in the circuit, 43 per cent is from the primary terminals of the distribution transformers to the customers' main switch. It can be readily seen that with 43 per cent of the total regulation of the circuit occuring from the primary terminals of the distribution transformers to the customers' main switch, some control point closer to the load than the primary load center is needed.

Voltage Regulation
Second Prize Answer to the Problem: "How Important Is Voltage Regulation? What Are the Most Practical and Economical Methods of Achieving It?"

Testing at the lamp socket for circuit control purposes is a practical impossibility from a number of points, the greatest difficulty coming in the number of tests necessary to arrive at a representative average voltage. The next step toward the energy source from the lamp socket is the customers' main switch. A particular circuit that serves an urban residential district with small business establishments throughout the district such as described for D-1, will have approximately 3,300 meters of which 100 are power. The remaining 3,200 represent commercial and domestic light meters. Not every meter will have a main switch at which a voltage test would be required in as much as there is more than one meter in some cases on a main switch. Even though the number of main switches be 50 per cent of the number of light meters, which is not the case, the number of tests to be made would still be too great to be of practical use in routine circuit voltage testing.

The next point removed from the lamp socket toward the energy source is the secondary. The circuit having essentially the same physical dimensions as those of D-1 would have approximately 110 individual lighting secondaries. While the number of lighting secondaries is much less than that of the main switches, 110 tests is as yet too many to make. The thought was expressed that possibly control points could be selected on a few secondaries in the circuit that would be representative or average of the entire number. It is readily seen that in a radial distribution feeder circuit, the voltage impressed on the secondaries at or near the load center of the primary, in gen-

eral will be higher than that on the secondaries near or at the end of the sub-laterals. Between the load center and the end of the sub-laterals are secondaries that will have an impressed voltage equal to the average between that at the load center and that at the end of the sub-laterals, the assumption being that all transformers carry the same per centage load.

Circuits of the type of D-1 were carefully surveyed with the object of selecting on each lateral a point in the primary that would be one half the electrical distance between the load center and the end of the sub-laterals. This point represents an average primary voltage for the respective lateral. Next a lighting secondary in the immediate vicinity of the above primary point was chosen for the secondary test. In choosing the secondary efforts were made to get one on which the services were more or less uniformly distributed throughout the length. To further approach the average secondary voltage, the point for secondary test was established half the distance from the transformer to the end of the secondary. In the above manner (for a circuit of the physical size of D-1) four points were chosen for the test. A fifth point at the load center was used as a check on the maximum secondary voltage being supplied from the circuit.

Tests were made with three wire graphic voltmeters for periods ranging from 24 to 72 hours per circuit. The respective hourly voltages for the four control were averaged and the resulting value considered as the average secondary voltage for the circuit. Checks were then made at random on the circuit, the values averaged and checked against the average for the four control points. Values of secondary voltage shown in column 1, Table I were found to be the average for those tests at random as well as in very close agreement with those of the control points.

In the case of the circuit from which the voltages in column 1, Table I were derived, attempts had been made at previous times using load center primary voltages to maintain the circuit in adjustment so as to give an average voltage of 114 volts. Column 2 of the same table shows the average of the four control points after further regulator compensator adjustments had been made. The 24-hr. average for column 1 is 112.8 volts; that for column 2 is 114.0. The maximum variation above the average voltage in column 1 is 0.9 volts or 0.8 per cent; below the average, 1.0 volt or 0.9 per cent. For column 2 the variation is 0.6 volts or 0.5 volts or 0.5 per cent above and 0.5 volts or 0.4 per cent below. Column 3 is

Table I—Voltage Conditions as Improved by Checking and Regulator Adjustments

Time	Aver. voltage from spot Checks	Aver. voltage of 4 control Points	Net voltage effected	Per cent watts increase by improvement	Kw. demand on circuit
12 M	113.0	114.0	1.0	1.3	306
1 AM	113.2	114.0	0.8	1.1	231
2	113.7	114.3	0.6	0.8	195
3	113.6	114.1	0.5	0.7	162
4	113.7	114.3	0.6	0.8	149
5	113.4	114.3	0.9	1.2	165
6	114.5	114.4	0.9	1.1	198
7	113.2	114.3	1.1	1.5	263
8	113.2	114.6	1.4	1.7	285
9	113.2	114.5	1.3	1.6	301
10	112.5	114.5	2.0	2.5	315
11	112.5	114.4	1.9	2.4	315
12 M	112.6	114.0	1.4	1.8	315
1 PM	112.6	113.6	1.0	1.3	324
2	112.5	113.6	1.1	1.4	328
3	112.5	113.8	1.3	1.6	355
4	112.4	113.8	1.4	1.7	360
5	112.2	114.0	1.8	2.4	400
6	111.8	113.7	1.9	2.5	564
7	111.9	113.8	1.9	2.5	1030
8	112.0	113.7	1.7	2.2	975
9	112.1	113.5	1.4	1.9	850
10	112.2	113.6	1.4	1.9	675
11	112.5	113.9	1.4	1.8	480

the net voltage increases that were effected. It is to noted that, at the time of greatest load, material voltage improvement was made.

Column 4 of Table I shows the percentage increase of watts that would be effected by the voltage increase as indicated in column 2, using a 115-volt standard lamp as a basis. The average increase over the 24 hours is 1.28 per cent. Column 5 shows the kilowatt demand on the circuit for 24 hours.

If the estimate is made that from 6 to 10 p.m. inclusive, the load on the circuit is composed of 90 per cent lighting and 10 per cent power. It can be shown that approximately 78 kw-hr. greater consumption occurs during the above-mentioned period if the voltages exhibited in column 2 rather than those of column 1 are maintained.

Table II shows in column 1 the lighting load calculated as above for the hours 6 to 10 p.m. inclusive. Column 2 is the percent watts increase for a voltage increase as exhibited for those hours. Column 3 shows the increase in kw. demand for those hours as effected by the voltage increases as of column 3, Table I. The total of column 3 is 82.5 which represents the increase of kw.-hr.

Table II—Effect of Better Regulation on Consumption

Time	Lighting load	Per cent watts increase with higher voltage	Increase in* kw. demand
6 PM	510	2.5	12.7
7	918	2.5	23.0
8	890	2.2	19.6
9	795	1.9	15.1
10	638	1.9	12.1

*Using voltage increases of Column 3, Table I.

If a further estimate is made that 5 per cent of the increased demand is caused by the increased charging current and losses in the distribution transformers due to a higher impressed voltage, a net of approximately 78 kw.-hr. would be realized over that period.

The circuit under consideration as stated before has mainly a domestic and commercial light load. Of the 2,695,000 kw.-hrs. used on the circuit per year, 2,190,300 are domestic and commercial light. The average rate paid for the lighting service is 3.85 cents per kw-hr. Therefore a net increase per diem of 78 kw.-hr. represents an increase in revenue of $3.00. The Sunday load characteristic is very similar to that of week days. The net increase in revenue therefore for a year is about $1,100.

The cost of making a test for voltage regulating purposes as described above will be approximately as itemized below:

Labor	$ 50.00
Supervision	5.00
Truck expense, etc.	50.00
Total	$105.00

Therefore on an expenditure of $105, of which none is a capital charge, a return of approximately 1,100 dollars is realized in one year. A rather intangible value of the test but of importance is that, by the information obtained, a more nearly correct value of impedance from substation to load was derived which will enable closer regulation to be maintained in succeeding years. Voltage regulation, therefore, is a method of increasing revenue and customer satisfaction.

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• ERRATUM—The oscillograph accompanying the article entitled "Radio Interference from A.C. Conductor Corona," page 21 of the May issue of *Electrical West,* was inadvertently inverted making it appear that the interference occurs when the conductor is positive instead of when it is negative. By inverting the illustration, the correct relationship between the oscillographic record and the text of the article will be obtained.

Coordinate New Load Building with System Characteristics

By A. A. KRONEBERG
Technical Assistant to Operating Engineer, Southern California Edison Co., Ltd., Los Angeles, Calif.

THE solution presented in this paper takes into consideration some of the limitations of existing production facilities, rather than any limitations of transmission or distribution facilities in considering what types and how much load can be added to existing facilities. The reason for taking production facilities into consideration is the fact that abnormally dry years impose serious limitations on the output of hydro-electric generating facilities, whereas loading of transmission and distribution facilities is limited only by their ability to carry a rated kw. load regardless of load factor. Hydro-electric generating plants are generally limited to a definite amount of kilowatt-hours and if called upon to deliver kilowatt-hours at a high load factor their capacity may be reduced to as low as fifteen per cent of their full load kilowatt rating. Experience shows that generating facilities to supply a certain load must be planned with assumed water conditions as in the years 1924, 1931, and 1934. This solution can be said to determine how much and what kind of load can be added to the system without exceeding the firm generating capacity of the system.

The amount of load that can be added is determined in the following manner. The kw-hr. capacity of all generating plants is determined by months for runoff conditions as of the year 1931. The capacity of steam plants is expressed on the basis of a 100 per cent load factor. The present system load is tabulated by months. The new load of known characteristics is then added by months until in some month either the peak capacity in kilowatts or the kilowatt-hour capacity is reached. In case the system kilowatt capacity is reached first is becomes the limiting factor. In case the kilowatt-hour capacity in a given month is reached it may still be possible to readjust somewhat the kilowatt-hour capacity by transferring some of the stored water power from one month to another.

The new loads added to the system in order of their desirability are as follows:

(1) All night and off peak loads
(2) Constant loads
(3) Industrial loads
(4) Proportional increase in existing load
(5) Agricultural load
(6) Lighting load

System Capacity

The system under consideration is assumed to have the following production facilities:

Hydro-electric plants	490,000 kw.
Operating steam plant capacity	280,000 kw.
Annual purchase of 900 million kilowatt-hours from an assumed installed capacity of	165,000 kw.
Total maximum capacity	935,000 kw.

System Loading

Second Prize Answer to the Question: "From the Operating Standpoint What Types and How Much Additional Load Can Be Added to Existing Electrical Facilities?"

The transmission facilities are fully capable of transmitting all the power that can be supplied by the above generating plants. A predominantly agricultural load is supplied in an area located approximately one-third of the total distance of transmission from the hydro-electric plants, while chiefly industrial and lighting loads are supplied in the vicinity of the steam plants.

Approximately one-fourth of the hydro-electric plant capacity is of the river flow type which means that the actual kilowatt capacity is at all times determined by the flow of the river. If the flow of the river exceeds the capacity of the plant the full kw. rating is maintained. If the river flow is less than full load requirements the plant capacity is reduced in proportion. The balance of hydro-electric plants have ample storage capacity for storing under favorable conditions some 1,150,000,000 kw.-hr. However, these plants are operated in accordance with irrigation requirements and storage in the reservoirs is not permitted until runoff exceeds a definite figure. In the year 1931 only 65 million kw.-hr. could be stored or less than ten days' supply of power. Under restrictions of this kind these plants nearly become river flow plants in so far as their kw.-hrs. is restricted to a given time the kw. capacity of the plants is available for system peaks.

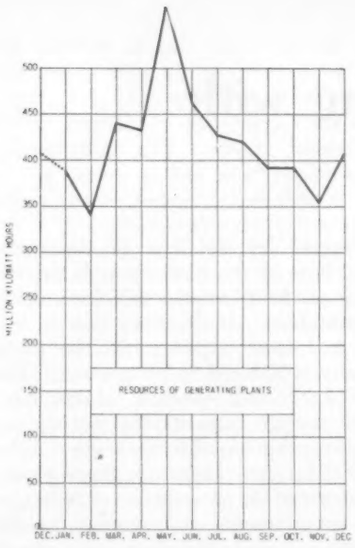
The steam plants are not limited in their output and can be operated at 100 per cent load factor and full capacity. However, the supply of natural gas used as fuel for steam generation is limited during periods of maximum demand for domestic use. Although fuel oil can be used for generation in the winter months the cost of production is considerably higher than when natural gas is used. The power purchased by contract is a fixed amount of 900 million kw.-hr. with an assumed peak capacity of 165,000 kw. This power together with the limited storage available in a dry year can be used to supply the deficiency during the low water period of the base hydro plants.

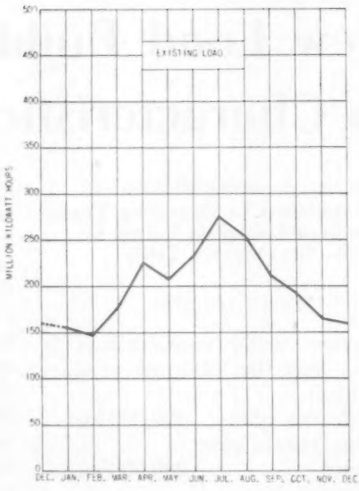
The kw.-hr. capacity of the system is shown in column 1 of Table I. It represents millions of kw.-hr. which can be delivered during a dry year provided the load factor of the load is high enough so that the maximum kw. capacity of the system is not exceeded.

Table I—Resources, Load and new Loads in million of kilowatt-hours

		New Loads to Be Added					
Month	Resources	Existing Load	Off-peak and all-night Load	24-hour Load	Industrial Load	Increase in existing Load	Agricultural Load	Lighting Load
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
January	389	155	219	174	154	110	22	62
February	342	147	178	157	147	105	13	57
March	440	176	178	174	149	125	24	50
April	432	225	153	168	146	160	75	49
May	566	207	138	174	154	147	116	46
June	462	233	115	168	160	166	147	44
July	*428	275	138	174	163	196	163	42
August	*420	254	159	174	170	181	190	42
September	*391	211	172	168	175	151	167	45
October	*392	192	197	174	174	137	103	49
November	355	165	212	168	168	118	78	54
December	403	160	237	174	163	114	45	57
Year	5023	2400	2096	2047	1923	1710	1143	597
Total with existing load	...	...	4496	4447	4323	4110	3543	2997
Usable capacity	...	...	527	576	700	913	1480	2026

*Adjustments can be made in these months by transferring not more than 32 million kw.-hrs. from one month to another.





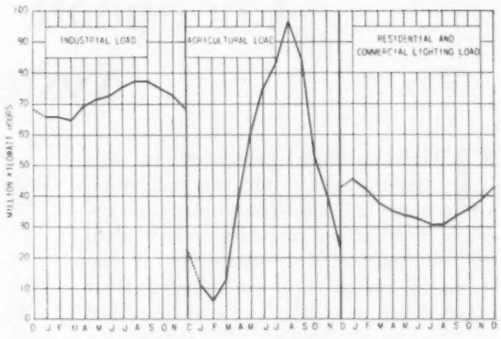


Fig. 1 (left)—Resources of generating plants by months. Fig. 2 (center)—Existing load on the system. Fig. 3 (right)—Characteristics of various classes of present load

The kw.-hr. of purchased power and stored water power are distributed through the months to give as even a monthly kw.-hr. distribution of total resources as possible. Some readjustment can be made during the months of July to October incl. The kw. peak capacity by months is not shown as it is not the limiting factor in the addition of any but lighting loads. Fig. 1 presents a graph of the kw.-hr. capacity by months.

The Present Load

The total existing load supplied by the system is completely defined in Table II where kw.-hr. output, kw. peak, and load factor are given by months and for the year. This total load is composed mainly of three major classifications of load; namely, industrial, agricultural, and lighting. These three classes of load are illustrated in Fig. 3. The total connected industrial load is 468,000 kw., it takes 855 million kw.-hr. a year, with an estimated maximum demand of 147,000 kw. The daily load factor of the industrial load is approximately 78 per cent, and the annual load factor 66 per cent. The total connected agricultural load is 237,000 kw., it takes 580 million kw.-hr. a year, and its maximum demand is estimated to be 197,000 kw. The daily load factor may be as high as 80 per cent while the annual load factor is only 36 per cent. The connected lighting load is 430,000 kw., the annual output to the lighting load is 438 million kw.-hr., and the maximum demand of the lighting load is estimated to be 250,000 kw. The daily load factor is in the order of from 30 to 40 per cent, the annual load factor 20 per cent. In addition to the three major classes of load the system delivers wholesale power to railroads, other utilties, and municipalities.

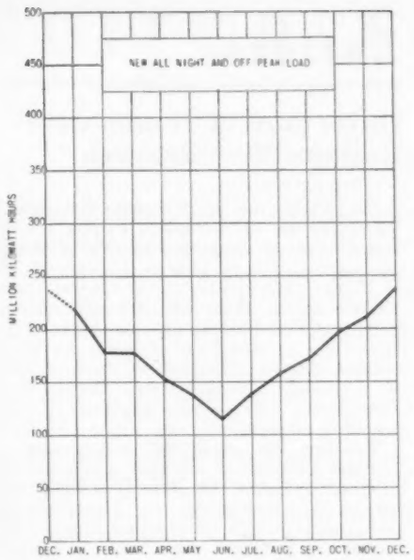
All the above described loads have been referred to the generating plants, that is compensated for transmission and distribution losses. The shapes of the kw.-hr. by-month curves have been derived from a five-year average for the years 1929 to 1933 inclusive. Thus on the basis of the annual output industrial load represents 35.6 per cent of the total load, agricultural load 24.2 per cent, and lighting 18.2 per cent of the total. The industrial load is more evenly distributed through the year and its load factor is fairly constant through the months. Agricultural load falls to a minimum in January, February and March and reaches a maximum in August. Lighting load is at a minimum in the summer and reaches a maximum output and peak in the month of January.

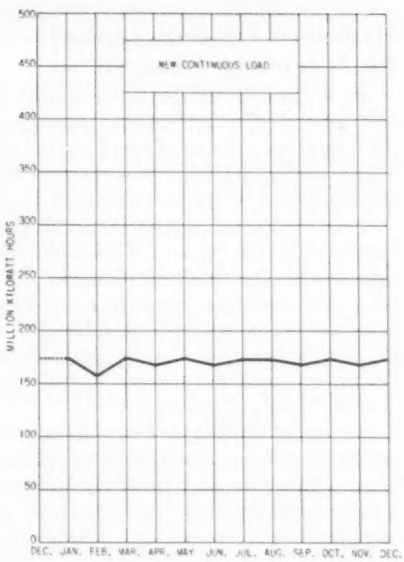
New Loads

In column 2 of Table I are tabulated kw.-hr. taken by the total existing load. In subtracing these values from the corresponding resources of the system it will be found that the excess capacity is lowest during the months of July to November. The new load to be added to the system will be limited by the available excess kw.-hr. capacity during these months. The new loads considered were arranged in order of their desirability. The most desirable load from the standpoint of utilization of all existing facilities is the off-peak type of load because this type of load would not require any addition of capacity in either transmission, distribution or generating facilities. The off-peak load will be limited entirely by available kw.-hr. capacity of generating facilities. All night load is combined with off-peak loads in this study because it is essentially an off-peak load although it does add some kilowatts to the system peak and may require additional distribution capacity. However, from the standpoint of the capacity of the generating facilities both off-peak and all night loads can be considered simultaneously, as these loads make the greatest improvement in system load factor. The next best load considered is a continuous load or load of 100 per cent load factor. Such load may require a few additions to the distribution facilities but in most localities can be added without increasing existing facilities. Continuous load also improves the load factor of the system but not as much as do off-peak and all night loads. In selecting other types of new load it was necessary to use loads of known characteristics and for this reason loads similar to the existing ones were selected. Of these, industrial load has the highest annual load factor and affords better possibilities of improving the annual load factor of the total load. By the same line of reasoning a uni-

Table II—Characteristics of Existing Load

Month	Load Million Kw-hr.	Peak Thousand Kw.	Load Factor	Per Cent of Annual Load	Per Cent of Annual Peak
January	155	373	.557	6.45	81.3
February	147	361	.606	6.13	78.6
March	176	401	.589	7.33	87.4
April	225	459	.680	9.38	100.0
May	207	420	.665	8.62	91.5
June	233	451	.715	9.71	98.3
July	275	457	.810	11.46	99.6
August	254	451	.755	10.60	98.3
September	211	417	.702	8.80	91.0
October	192	415	.622	8.00	90.5
November	165	418	.550	6.87	91.1
December	160	387	.553	6.65	84.4
Year	2400	459	.596	100.00	100.0





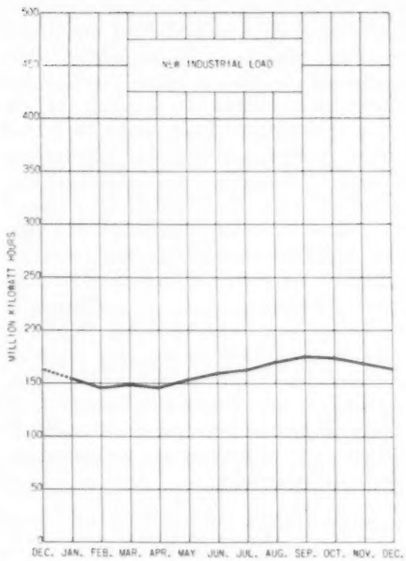


Fig. 4 (left)—Amount of all night and off-peak load possible without addition to generating facilities. Fig. 5 (center)—New continuous load possible without generating additions. Fig. 6 (right)—New industrial load possible without generating additions

form increase in all existing loads, an increase in agricultural load, and an increase in lighting load were considered in order.

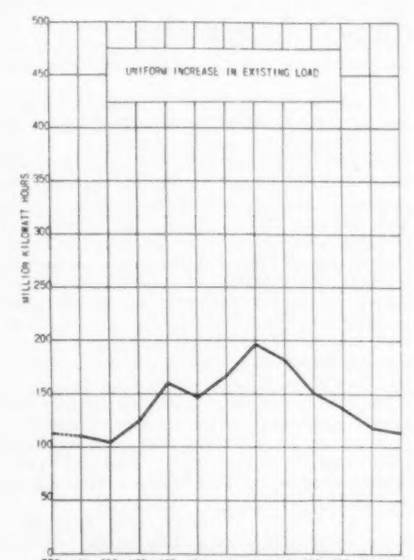
The first load considered is a combined off-peak and all night load. Examples of all night load are highway lighting, all night advertising displays, airway beacons, etc. Examples of off-peak loads are storage water heaters with time clock control. The amount of this load when added alone to the existing load without requiring additional generating facilities is shown in column 3 of Table I and its graph is shown in Fig. 4. It was assumed that the kw.-hr. taken by this load will be proportional to the total period of darkness during the month. The improvement of load factor due to a load consisting of one-half all night and one-half off-peak load would be from .596 to .750.

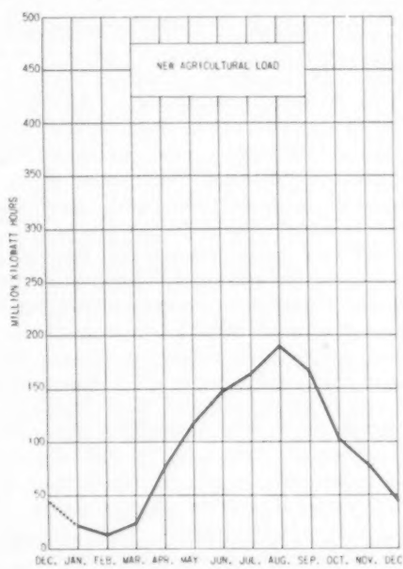
The next most desirable load is the constant load. Examples of constant load are refrigerators in sufficient number, oil well pumping, some industrial heat and chemical processes, etc. A constant load of 2,047 million kw.-hr. annual consumption could be added to the system under consideration without exceeding its generating facilities. The kw.-hr. consumption by months is shown in column 4 of Table I and in Fig. 5. The improvement in annual load factor of the total load would be from .596 to .736.

A new industrial load having characteristics similar to the existing industrial load can be added to the system if the total annual consumption of this load does not exceed 1923 million kw.-hr. This is 2.25 times the existing industrial load. The monthly kw.-hr. taken by the new industrial load are shown in column 5 of Table I and are shown graphically in Fig. 6. The improved annual load factor of the total load would not be less than .623.

In column 6 of Table I and in Fig. 7 are shown the results of a proportional increase in all existing loads. The annual load factor will of course remain unchanged and the total increase of load will be limited to 71.2 per cent of the existing load by the ability of the generating facilities to supply the required kw.-hr. in the months of July, August, and September.

The remaining columns 7 and 8 of Table I and the corresponding graphs shown in Fig. 8 and 9 illustrate the





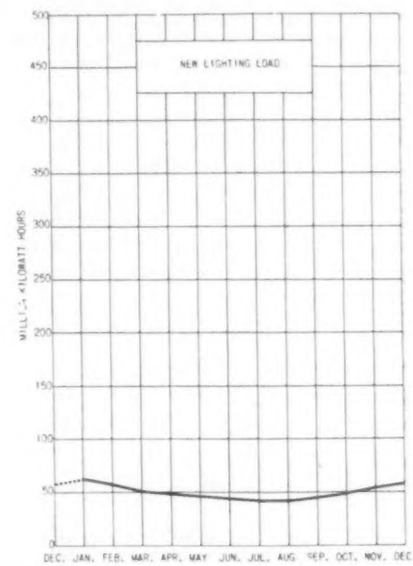


Fig. 7 (left)—Results of proportionate increase in all types of load. Fig. 8 (center)—and Fig. 9 (right) — Amounts of agricultural and new lighting load that could be added independent to existing load

amounts of agricultural load and lighting load which could be added independently to the existing load. Approximately twice the amount of existing agricultural load could be added to the system without new production facilities. However the annual load factor of the total load would be reduced to about .490 and additional distribution facilities would probably be required to take care of nearly all of the new agricultural load. Approximately a 140 per cent increase in lighting load could be supplied by existing generating facilities. Such an increase in lighting load would lower the annual load factor of the load to about .40 and additions of distribution transformers would be inevitable.

Conclusion

A study of Table I will reveal the following facts: Neither of the new loads when added to the existing load will permit the full utilization of available resources. The addition of maximum off-peak load still does not permit the use of some 527 million kw.-hr. of available resources. This is due to the fact that the generating facilities have their maximum kw.-hr. capacity in the month of May while the maximum requirements of the load are in the months of July and August. Thus the maximum load is limited by resources available in July and August and the excess of generating capacity in the earlier months of the year can not be utilized.

To review the situation in general the following figures are used to illustrate the limitations of production facilities: The 490,000 kw. of hydroelectric plants if they could be operated at full capacity through the year together with the steam plant capacity and 900 million kw.-hr. of purchased power would produce 7.65 billion kw.-hr. a year. In a dry year the resources are reduced to 5.00 billion kw.-hr. Of this last amount from .50 to 2.00 billion kw.-hr. can not be used due to difference in distribution of load and resources by months. The best utilization can be obtained by the addition of all night and off-peak loads making a total load of almost 4.50 billion kw.-hr. and the poorest utilization will result from the addition of lighting load when only three billion kw.-hr. can be delivered to the load. The results of this solution could be interpreted to show that one kw.-hr. of all night and off-peak load, or 24 hour load is four times more desirable from the standpoint of utilizing existing production facilities than one kw.-hr. of lighting load and twice as desirable as a kw.-hr. of agricultural load.

Hydrogen Cooling Applied To Frequency Changer

An outgrowth of the development of hydrogen-cooled synchronous condensers which have been adopted by the industry during the past few years, is the application of hydrogen cooling to a new frequency changer for the Pennsylvania Power & Light Corp. The new frequency changer, built by General Electric, will convert three-phase power from 60 cycles to 25 cycles for use at the Bethlehem Steel Co.'s plant at Bethlehem, Pa., and will deliver 22,222 kva. at 6,900 volts, .9 power factor.

Hydrogen cooling is more efficient in that it permits a saving in physical size of the machine and reduces windage losses approximately 90 per cent as compared with air cooling. Electrically the tendency for the formation of corona also is eliminated by the use of hydrogen.

Hydrogen pressures from ½ to 1 lb. per sq. in. are maintained within the case of the frequency changer by means of an automatic pressure regulator which takes make-up hydrogen, when required, from an auxiliary tank. This pressure, enough to insure that any leakage which occurs will be outward, maintains the purity of the hydrogen in which the machine operates.

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Synthetic Rubber Improvement Commercially Practicable

CULMINATING years of extensive research, the E. I. Du Pont De Nemours & Co., Inc., announced the successful production of a synthetic rubber to be known as DuPrene in 1931. Since that time repeated applications of this material to industrial usages has proven its practicability and has stimulated general interest in the subject.

The synthesis of DuPrene starts with the formation of calcium carbide from coal and limestone. Calcium carbide is converted to acetylene gas. Acetylene gas is polymerized in the presence of a catalyst to form a material known as monovinylacetylene. Treatment of the material with muriatic acide produces chloroprene. When freshly made, chloprene is a thin, clear liquid. However, it is unstable and cannot be kept in the liquid state. It spontaneously changes to a plastic solid which closely resembles the natural rubber of commerce.

In common with crude rubber, Du Prene is reinforced with different materials to produce commercial compounds for various purposes. At the present time its cost is several times that of crude rubber, but the characteristics of the material are superior for many applications to those of natural rubber.

Letters...

Direct Current Transmission Requires More Research

To the Editor:

Sir—Within the last few years the possibility of the use of continuous current for the transmission of power has become of serious interest to engineers both in this country and in Europe. The article "Direct Current Transmission Given Practical Demonstration" in *Electrical West* for May indicated many of the advantages of this form of power for transmission, discussing particularly its application in a constant current system. That such an arrangement will operate satisfactorily was proved by experiment.

Whether the mode of transmission is constant current or constant potential, the superiority of direct current is limited to this part of the power system. For generation and distribution present practice has largely been followed in proposed plans involving continuous current transmission. It is necessary, then, to compare the cost and performance of high voltage alternating current lines with those of high voltage direct current lines and requisite conversion equipment. All the factors involved in such a comparison are not easily evaluated, especially without more research and operating experience. In the main, however, the advantages of direct current lie in the opportunity for increasing the transmission efficiency and improving the system stability. The former is due to the higher effective operating voltage allowable for a given amount of insulation and corona loss. The latter is a result of reduced system reactance and the fact that the alternating current systems at the ends of the line need not operate in synchronism.

These advantages of direct current have been mentioned without any consideration of the effects of the conversion equipment required. Since the allowable power loss in a long alternating current line is generally but a few per cent, any saving that might be obtained with direct current could not be more than a small fraction of the total system loss. Unless the efficiency of the conversion process were very high, the superiority of direct current would be seriously affected. In addition, it is likely that this process would not act to improve stability. At present there is not available such apparatus for handling the large quantities of power at the high voltages necessary for competition with alternating current. Even if this were not the case, all expenses connected with this equipment would necessarily be charged against the direct current system.

A number of problems of more secondary nature must be investigated before direct current transmission can be attempted. Equipment that is not yet available must be developed for the protection of the transmission system. Present circuit breaker design is probably entirely inadequate for the interruption of large continuous power currents. The operation of present types of insulators under unidirectional voltage stress, especially in regions of fog or dust, will have to be studied more completely. The importance of harmonics introduced in the terminal alternating current systems has already received some attention, but there is yet much to be done in this respect. These and other problems indicate that it is probable that, either for new transmission projects or for changing over existing lines, direct current will not for a number of years offer serious competition to the present use of alternating current.

William G. Hoover.
Department of Electrical Engineering,
Stanford University.

EDITORIAL + + +

Quality Merchandise

INVOLVED in the long-term purchase plans developed for the purpose of increasing domestic load is a joint responsibility between the power companies and the manufacturers. For self protection the utilities must sell only that class of merchandise whose quality and durability are certain. Service problems must be minimized, not only because of the possible additional costs but also to assure customer satisfaction. With payments extending over periods up to five years, there are hazards which must be taken into account and anticipated if the customer is to be kept sold on the appliance and the service he purchases.

Manufacturers must shoulder a portion of this responsibility also. They must see to it that the appliances they offer meet the requirements for long-term financing. Quality standards cannot be sacrificed. Styling must be uniform. Otherwise there can only be dissatisfaction and ultimate losses for all parties.

These same arrangements hold for rental programs as well. There is little difference between renting an appliance and selling it on five-year terms.

The industry has too much at stake to take chances with anything but the best merchandise in these new forms of load-building. One serious mistake might result in a setback for electric cookery or electric water heating, recovery from which would be long and tedious. Customer satisfaction should be paramount.

Association Brought Home

ASSOCIATIONS, as a rule, have come to be regarded as something to which many belong, a few go to conventions, and still fewer remember what transpired in the sessions. Among the changes which took place in the reorganization of the functions of the Pacific Coast Electrical Association perhaps the most important was that this tradition was shattered to bits. Many belong to it, a large number of those participated in its activities, there was no convention as such, and instead the convention and its sessions was brought to the members.

Pacific Gas and Electric Company even went one step farther—it brought the association home to its members by holding small conclaves in each division so that the best papers from the association's contest might be read, digested, discussed, and whatever lessons they contained drawn from them. In this manner the association truly became what its name implies—a gathering together of members of the industry to discuss and to consider means to improve their business. Dealers, contractors, wholesaler's salesmen and utility employees and district managers sat down together, read the prize winning papers, discussed their application to problems right on the home grounds, and the industry will be benefitted materially thereby.

This year the association set about to bring itself into contact with the real problems which faced the business. It analysed these problems and presented a clear cut statement of them to the industry—both at the conclaves and subsequently in print. Then it instituted a contest among its members for suggestions and ideas for the solution of these problems, or at least improvement of methods to deal with them. These answers were printed in our last number and are being run in this and subsequent issues, again to bring them right out into the field and to the membership. The final step taken by Pacific Gas and Electric, that of holding miniature conventions in each district, was a personal and really vital means of bringing the association home to each and every member.

Electrical Modernization

PART of the credit for the record appliance sales of the first six months of 1935 is due to the FHA financing program. Slow to capitalize on this system of easy financing at first, the electrical industry finally recognized the opportunities it offered and retailers and utilities have utilized them to the fullest extent.

However, the appliance group have been the only ones to benefit appreciably from the $2,000 of easy credit which the FHA made available to homeowners. Some homes have been rewired, but the volume of this business has been but a small fraction of that which has gone into the purchase of refrigeratiors, ranges, washers, ironers and other eligible appliances.

Now the balance of the industry is to have its opportunity. The Federal Housing Administration has announced with the extension of Title I of the NHA to April 1, 1936, there has been included an amendment whereby modernization credits in amounts up to $50,000 to improve business structures of all types will be made available. Hotels, apartment houses, hospitals, schools, stores, office

buildings, colleges and industrial plants all qualify.

Thus there is brought to the manufacturer, wholesaler and contractor an unparalleled opportunity to sell electrical modernization and its advantages. With a campaign, either joint or individual, built around some such slogan as "modernize electrically for profit," the industry can develop business which will provide work, consume material and build load. The field for aggressive selling has been extended by the provision of adequate credit for the responsible prospects of every contractor or manufacturer.

Sales prospects are unlimited. Countless hotels, office buildings and apartments need rewiring and better lighting. Stores can be relighted or equipped with modern signs. Lack of funds for the installation of air conditioning equipment can no longer be held up by a prospect as an obstacle to the salesman of that equipment. Industrial plants can make much needed alterations and additions of equipment to facilitate production or increase efficiency. In this one field alone it is estimated that the market for machinery will reach several billion dollars.

The industry should familiarize itself with the provisions of the latest amendment to the NHA. Regulations are largely similar to those required for the $2,000 home modernization loans. The loans may have a final maturity limit of five years. At no time in the history of the industry has a greater potential volume of business, pent up by lack of credit, been placed directly in the hands of the contractors, manufacturers and utilities. The volume of business will be measured only in terms of the selling effort put behind "electrical modernization for profit."

Bonneville and King Salmon

ONE of the heavy impositions on the power industry has been the requirement by fishery interests that provision be made for the passage of salmon over dams. There has been no complaint in the past and the utilities have cooperated wholeheartedly in the study of this problem and in the development of adequate facilities to preserve the supply of this food and game fish.

In the case of the Bonneville project on the Columbia River, however, an entirely new aspect is placed on this situation. Originally estimated to cost $800,000, the fishways as now approved will cost $3,200,000 and applications have been made by the fishery interests for even more elaborate provisions. Bonneville is but the first of a series of dams which are ultimately to develop the full navigation and power resources of the Columbia. Taking a long range view, some pertinent questions might be asked of the fishery people.

Is every dam to be erected to carry a $3,000,000 or $4,000,000 fishway system? If this is to be the case, the ultimate cost will far exceed the value of the commercial salmon industry of the Columbia, whose pack was valued at $3,500,000 in 1934 and as high as $7,000,000 in recent years. Will the creation of a series of huge lakes between Bonneville and the higher reaches of the river have any effect on the habits or likes of the fish? Experts cannot agree. Is there any experience to prove that under such circumstances the salmon will not desert the river entirely? None has been brought forward. Would not the expenditure of a smaller sum in Alaska on hatcheries and stream control do more to assure a future supply of salmon than the millions ultimately required for fishways on the Columbia?

These questions must be answered ultimately. The fishery interests should answer them before more millions are spent on fishways.

Sell the Safety Program

REASSURING was the interest and discussion provoked by the report of the Safety Committee of the Northwest Electric Light and Power Association. Great strides have been made by electrical utilities in reducing lost time accidents through employee training and safety supervision. There is no activity that pays larger dividends in human happiness and in earnings for both the employee and employer.

Even through the period of curtailed construction activities, most companies have invested time, effort and money in educating employees to work safely. It is an investment that has paid handsome returns in fewer accidents, faster work and more reliable employees. But how many companies have capitalized to the fullest extent upon their safety program? It is a splendid opportunity to build a priceless ingredient of utility operations—employee good will.

Admittedly most safety programs stress the fact that safe working conditions add to an employees' income and eliminate lost time and doctor bills. Yet how many tell their employees that safe working conditions are insisted upon because the company is interested in the welfare of each individual—that the company values highly the loyalty of its workers who are in full possession of their limbs and faculties. How many companies try and *sell* the safety program on its proven merits instead of putting it out cafeteria style for every employee to take and interpret as he sees fit. It takes only a sketchy knowledge of psychology to inject the angle into any employee training program which will arouse the loyalty and improve the morale of an organization which *knows* that the company has a genuine interest in the happiness, welfare and future of every man and woman in it.

Significant Trends + + +

[*Signposts which point the road to improved business or method, brief, pertinent, useful hints as to HOW someone has blazed a new trail*]

...in the Motor Shop

Fig. 1—Steamer Santa Cruzcement discharging bulk cement by means of the compressed conveying equipment through the two 12-in. lines shown in the foreground

Compressed Air Conveyors Cut Cement Handling Costs

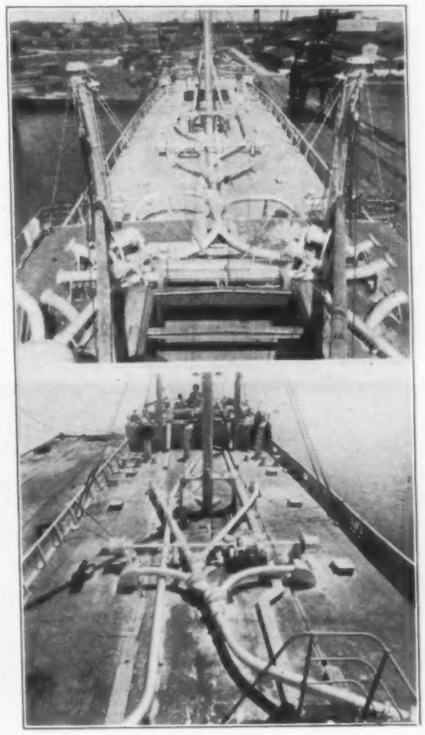
Santa Cruz Portland Cement Develops Revolutionary Methods of Handling Bulk Cement. Distributing Plants Being Constructed in Many Pacific Coast Cities

PROBABLY one of the most interesting and unusual industrial installations made in the West in recent years is the coastwide cement distributing method developed by the Santa Cruz Portland Cement Co. Prompted by high freight rates which often equaled the production cost of the product delivered to the consumer, research was undertaken by this company to ascertain if less expensive transportation costs were feasible, with the result that an entirely new technique was developed for the handling of cement in bulk.

The main plant of this company at Davenport, Calif., is the source of much of the cement used in Pacific Coast cities and the immediate interior. Prior to the installation of new equipment, cement was shipped in sacks or barrels by rail, trucks, or boats, principally the latter. Sacking and handling costs were high and transportation difficulties were complicated by the fact that the depth of Monterey Bay did not permit large ocean-going vessels to dock at the plant but forced them to remain anchored in the more or less open roadstead during loading.

In searching for some way of moving bulk cement economically and efficiently, the idea of compressed air conveyors offered the most promise. Developmental work proceeded along this line with the result that practical equipment was devised. Immediately the company began to renovise its distribution set-up.

Fig. 2—Arrangement of the permanent cement loading pipe on the forward and after decks of the steamer Santa Cruzcement



At the plant air-conveying machinery was installed which will transport bulk cement a distance of over 2,000 ft. through 12-in. pipes carried out over the water of the bay to the ship anchorage.

The steamship *Pacific Codar* was purchased and converted into a bulk cement carrier and renamed the *Santa Cruzcement*. In the reconstruction of the interior of the hull, the main hatches were removed and four self-trimming, hopper type bins having a total capacity of 40,000 bbl. of cement were installed, two on each side of the ship fore and aft. Over the main hatches a new steel deck was installed and four new 30-in. hatches installed. A permanent 12-in. piping installation was installed on the fore and after decks, as shown in the accompanying photograph. Two 12-in. pipe lines with receiving connections on both port and starboard midships receive bulk cement during the loading operation and distribute it to the bins, delivery being controlled by two-way distributing valves.

Below decks the hopper type bins discharge into two V-shaped troughs running fore and aft under each hold. Each trough is equipped with a 4-cu.yd. electrically-driven tunnel scraper which drags the cement aft (in the foredeck tunnels) to a common hopper, the hopper in turn discharging into a high-speed screw pump which with the aid of injected compressed air discharges the cement ashore through a 12-in. pipe line. Similarly cement is discharged from the after hold in the ship. Each of the discharge pumps is driven by a 250-hp., 2,300-volt, three-phase, 60-cycle induction motor, the pumps being rated at a capacity of 1,000 bbl. of cement per hour at 60 lb. per sq. in. pressure, giving a total discharge capacity of 2,000 bbl. of bulk cement per hour from the ship.

Compressed air is furnished by four reciprocating two-stage air compressors each driven by a 300-hp., 160-r.p.m. synchronous motor. Compressors have

Fig. 4—New bulk cement distributing plant of the Santa Cruz Portland Cement Co. at Alameda, Calif. Cement discharged from the steamer is blown through the permanent piping installation on top of the bins and delivered to the respective storage bins at that point. Distribution from storage is accomplished by the equipment housed in the building on the left

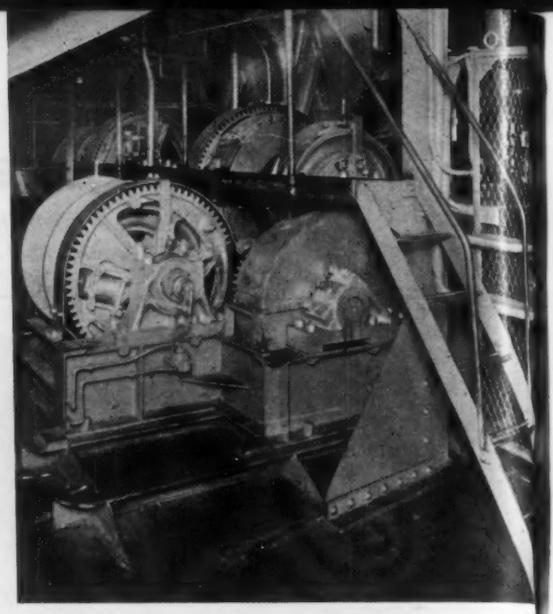


Fig. 3—One of the four 300-hp. air compressors aboard the vessel

a capacity of 1,500 cu. ft. per minute of free air at 100-lb. pressure.

To supply power for the electrical installation aboard ship a complete power plant was installed. Power is generated by two turbo-generator sets of 1,000-kw. capacity each which supply 2,300-volt, 60-cycle, three-phase power to a sixteen-panel, 2,300-volt switchboard from which power feeder circuits are taken. While each turbo-generator set has its own auxiliary equipment, steam is supplied at 200 lb. boiler pressure from the ship's boilers, this being possible because the discharge conveying equipment is not in operation while the ship is under way.

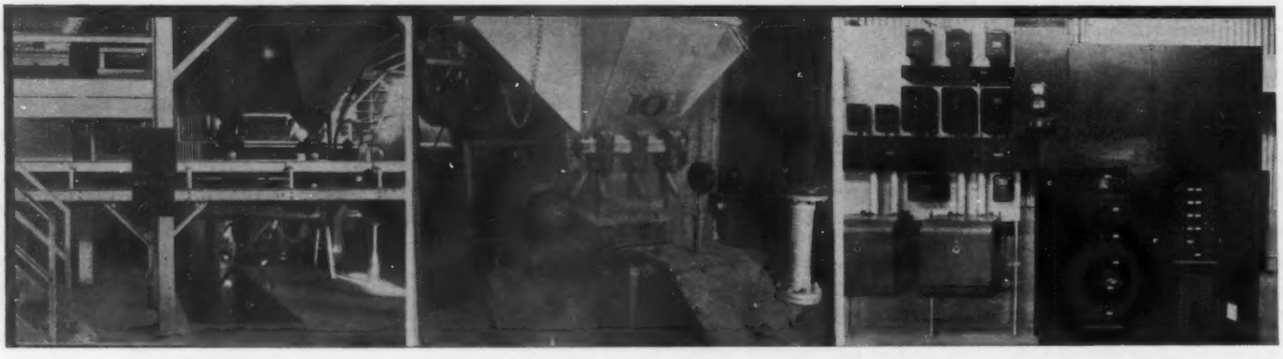
Inasmuch as the cement is discharged in bulk from the ship, storage and distributing plants of the company also had to be constructed to handle the bulk product. Several such plants have been constructed, the most recent one being that on the estuary in Alameda, Calif. At this plant a permanent piping installation delivers the bulk cement discharged from the ship to ten huge concrete storage bins. The bottom of each bin is formed into a hopper pipe discharge, there being five such discharge points in line under each side of the group.

On a track immediately below each battery of discharge hoppers a discharge car moves. This portable equipment consists of a 50-hp. induction motor with a starting compensator, the motor driving a screw type discharge pump similar to that used aboard ship. Electric power and compressed air are supplied to the car through a cable and flexible pipe respectively, the discharged bulk cement also being delivered through a flexible tubing so that the car may be clamped to the position under any one of the five hoppers.

Cement discharged from the storage tank in the above manner is delivered to hoppers in the distribution plant where it is automatically weighed and delivered either to the sacking machine, directly into barrels or discharged in bulk to pre-mix trucks or freight cars. By means of a reversible conveyor running transversely across the distributing plant, bulk, sacked or barrelled cement is delivered either to the rail siding on one side of the building or to the loading platform for trucks on the other.

Below

Fig. 5 (left)—A section of the distributing plant showing the push-button station controlling practically all of the operations in the building. In this building cement is automatically weighed and delivered either to sacking or barrelling machines or in bulk to trucks or freight cars. The conveyor in the foreground is reversible, so that the finished product can be delivered either to the railroad siding on one side of the building or to the truck loading platform on the other. (Right)—Plant's electrical distribution is accomplished through this de-ion equipped panelboard which requires but one-third the space of the conventional board of equivalent capacity. At the left are mounted 440-volt starters for various motors in the plant. Interesting are the three dry-type transformers shown at the upper left which supply 220-volt power for the automatic weighing equipment. Center)—Discharge car upon which is mounted a motor-driven screw pump with compressed air for discharging the cement supplied through the flexible pipe shown on the extreme right. This car, moving along the track, may be clamped in position under any one of the five discharge hoppers of the storage tank, thereby eliminating the need for a complicated conveying equipment in the discharge plant. A similar car operates on the other side of the battery of storage bins



Two multi-stage air compressors each driven by a 300-hp. synchronous motor supply compressed air for handling the cement at the distributing plant. From a transformer bank outside the plant 440-volt power is delivered to a switchboard equipped with de-ion circuit breakers instead of the conventional fuse-switch panelboard. It is interesting to note in this connection that the space required for a 600-hp. panelboard using this construction is approximately one-third of the space formerly required for a board of equal capacity built on the conventional fuse-switch plan.

While the original investment in the new conveying equipment was high, approximately half a million dollars alone being expended for converting the *Santa Cruzcement* into a bulk cement carrier, operating and transporting costs have been reduced to a minimum. With this new air conveying equipment it is estimated that transportation costs for cement laid down in Pacific Coast ports will be as low as one-twentieth the amount of transportation under the old method. Under the new system practically the only item of operating expense is electric power or fuel oil, depending upon whether the shore plant or the ship operations are being considered. Labor costs are reduced to a minimum and spoilage of cement due to exposure to the elements is completely eliminated from the time the cement leaves the plant until it is distributed to the ultimate consumer.

Electrical installation at the Alameda plant, pictured here, was made by the California Electric Co. Ltd., of Oakland and involved many of the engineering problems in the design of the job. Its electric motor shop facilities, plus its skill in installation design, contributed materially to the efficient operation of the plant.

...in Wiring Rules

Exhibit Planned For Seattle Inspector's Convention

Manufacturers are invited to exhibit their products at the convention of the International Association of Electrical Inspectors to be held Sept. 3-5 in Seattle at the Olympic Hotel. The convention committee is desirous of obtaining as early as possible names of exhibitors. Complete details may be obtained by communicating with Tom Widrig, Trumbell Electric Mfg. Co., Seattle, who is in charge of the exhibit for the convention.

Those in the electrical industry who plan on visiting Seattle during the summer months will be interested to know that there are two important electrical conventions to be held on consecutive weeks, The A.I.E.E. Pacific Coast convention, Aug. 27-30, and the I.A.E.I. on Sept. 3-5.

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Inspectors Entertained by Long Beach Industry

ROYALLY entertained by Otis Newcomb, chief electrical inspector of Long Beach, by the Electrical Contractors Assn. of that city and even the mayor, the Southern California Chapter, of the Southwestern Section, International Assn. of Electrical Inspectors, had a record attendance at its fourth regular meeting of the 1934-35 season on May 22. Chairman J. H. Crannell presided.

The morning session was devoted to discussion of sequence metering installations, requirements and experience; proper location of transformers and transformer vaults for school buildings; bonding problems where concentric knockouts are removed and reducing washers used; small burs left in the wireways of electric metallic tubing when new listed fittings, attached by a special tool which crimps the fitting into the tubing, are used; and a re-arrangement of the National Electrical Code as proposed at the recent meeting of the electrical committee of the National Fire Prevention Assn. R. H. Manahan, who attended this meeting, reported on this subject and suggested that if the code is re-arranged and additional phraseology is added it will be difficult for the rank and file of the electrical trade which is now used to the present code to find the items required.

Bert Johnstone, city electrician of San Diego, extended an invitation to all to attend the convention of the Southwestern Section in San Diego Sept. 10-12 and to see the California Pacific International Exposition at the same time. President Arthur Veit, of the Southwestern Section, announced that he was sending letters to the mayors of various cities requesting city electricians' attendance at the convention.

During a luncheon given by the electrical contractors a clever comedy playlet entitled "Scum" was enacted by James Morgan, Miss Marion Dudley and Gregory Cole. It depicted the horrible things which happen when a young couple buy electrical appliances not bearing the Underwriters' Laboratories label.

The afternoon session opened with a discussion of various rules of the Industrial Accident Commission and cautions in regard to various kinds of installations. Particularly Mr. Frank Short, electrical engineer for the state of California, cautioned that electric fly catchers be Underwriters' Laboratories listed. He also touched upon use of metal wiring gutters for interconnection of enclosed switches, grounding conductor connections, that underground service conductors be lead covered, that electrical equipment for spray booths be located outside the booth and that explosion and vapor proof fittings are not acceptable.

There followed some discussion relative to the provision of space for meters, service switches and other electrical equipment by building ordinances. An interesting fact was brought out that although Underwriters' Laboratories list a number of combination panels which embody all of these in a single box, the trade has not made much demand upon the manufacturers for such equipment as yet.

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• THOMAS MARTIN, acting city-electrician has been permanently appointed head of the civic electrical department at Vancouver, B. C. This appointment culminates a long and varied electrical career commenced in Staffordshire, England, where he was first apprenticed. Mr. Martin came to Vancouver in 1907 after service with the Bell Telephone Co., and joined the electrical contracting firm of Cope & Frey, Ltd. In 1912 he joined the city electrical department and rose step by step to his present post as city electrician.

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• LICENSES in the California State Contractors License Bureau are being renewed this year at a much faster rate than for the past few years, according to William G. Bonelli, state registrar of contractors. Amendments to the contractors' license law are now before Governor Merriam for signature, yet the license fee remains at $5 for renewals.

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• MATT-HEW HUTCHINSON, for 40 years head of the municipal lighting department at Victoria, B. C. has filed his application for retirement. Born in Paisley, Scotland, Mr. Hutchinson joined the city service in 1868 and was made superintendent of the electric light plant and fire alarm system. In 1912 he was appointed city electrical engineer and superintendent of the lighting department.

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• T. MARTIN, city electrician, Vancouver B. C. has advised the City Council of the necessity of restoring all electrical inspectors to full time. At present these officers are working on three-quarter time schedule, and work is falling in arrears as demands increase. In addition, Mr. Martin is also desirous of placing one inspector on electrolysis tests.

...in Construction

Work Starts on G. E. Prize Houses in the West

DESIGNED from the inside out—in other words, determined by the electrical equipment necessary for modern, convenient and healthful living, and building the house around that equipment—the new General Electric Co. architectural contest prize houses are beginning to rise from the ground as actual demonstration and selling homes in all parts of the West. When the company completed its contest among the architects of the nation, and received thereby 2,040 entries from 9,700 architects, the plans did not rest there. The prize winning homes are actually to be built, one to each 100,000 population, and placed on display for two months beginning Sept. 1, 1935.

Already ground has been broken and foundations are rising on the first of these houses in San Jose, Calif., where George S. Kocker Construction Co. is building the grand prize winning model. Meanwhile by the organization of committees of General Electric Co., General Electric Supply Co. and local distributors and dealers in each of the districts of the company, building contractors are being contacted and arrangements made for the erection of a model home built to one of the prize winning plans in each population center representing about 100,000 population.

There are four types of homes to be selected from among 25 prize winners by the builder, ranging in selling price from about $7,500 up. The General Electric Co. extends credit to the builder through its electrical dealers and distributors, for the basic electrical material and equipment involved. Otherwise the builder finances the project himself or with the aid of Federal Housing Act loans. The F. H. A. is co-operating in the move in every respect since it will become a nation-wide means of stimulating public interest in building of modern homes.

Already 18 homes are under way in Southern California, where the committee is headed by Sam E. Gates, and possibly a total of 30 will be built altogether. These will be located in all of the principal cities of Southern California.

In Northern and Central California about 20 houses are planned by the committee headed by C. W. Hartenfels. Of these 9 have been started and negotiations are under way for the others at the present time. Those started are located in San Jose, Sacramento, Piedmont, Oakland, Berkeley and Yuba City.

Portland has a committee headed by George Boring, which is planning about 15 homes in Oregon. Similar committees are to be formed in Salt Lake City and Seattle, where a like number of the "New American" homes will be built.

With the opening of the homes on Sept. 1 will be staged nation-wide publicity, to which local publicity will be tied. An extensive program will be carried out to bring to the homes the largest possible number of people. Each of the homes must be equipped with G. E. heating plant, air conditioning, laundry equipment, all-electric kitchen, radio and lighting.

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• "HANDBOOK FOR THE MAN ON THE JOB," a 90-page illustrated handbook showing methods of installing surface and extension wiring with the use of metal molding, floor, and extension duct is offered the trade by National Electric Products Corp., Pittsburgh, and is available through representatives of that company. The value of the book is in the practical installation methods graphically illustrated and the complete showing of all types and kinds of problems solved by the use of these surface wiring methods. The book is particularly valuable in the modernization of old premises and the adding of circuits or outlets for greater convenience in the use of electricity by consumers everywhere.

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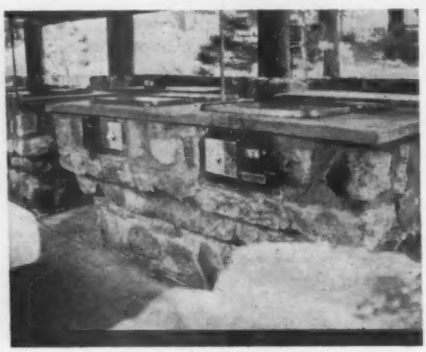
Electric Cooking for Picnickers

Conveniences provided for picnickers at the Crystal Lake playground of the City of Los Angeles are such that hot dishes of various types can be cooked electrically on the hot plates set in natural stone foundations. Each grill is controlled by the conventional two-heat switch and the energy consumption is limited by means of a coin operated Welcome Meter.

The insertion of a small coin in the meter provides sufficient energy to cook an entire meal quickly and without smoke, ashes and other discomforts associated with open fires



At Palm Springs

New electric shop in Palm Springs, is the Palm Springs Electric Co., built in the prevailing architectural style of that unique desert city

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...in Lighting

Garden Lighting Book Issued by P. C. E. Bureau

Pacific Coast Electrical Bureau has just issued a new garden lighting booklet entitled, "A Message to Garden Lovers" which is to be furnished to those who write for the booklet as a response to the magazine advertising being carried on by the Bureau in a number of Western publications. This advertising was being particularly featured during May and June, but it is expected that the call for the booklet will be spread throughout the year.

Prepared by Managing Director Victor W. Hartley, the booklet is attractively illustrated with a number of fine photographs of various kinds and types of garden lighting installations. In offering assistance to the public in the layout of garden lighting installations, the booklet suggests that the recipient describe the purpose for which the lighting is to be planned. These purposes are designated as (1) illumination of an outdoor living room, (2) illumination of a recreational area for playing of games, (3) lighting of pool, waterfall or some particular object or flower bed and (4) general lighting about the house as protection against prowlers. It is further suggested that the one desiring this assistance make a rough sketch of his garden and flower plots as an aid to the Bureau staff in making concrete suggestions as to lighting to be installed.

Copies of the booklet are available to electrical contractors and lighting salesmen as an aid to them in developing more lighting business during the summer season.

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• SAFETY IN HIGHWAY LIGHTING," an article in "The Highway Magazine" for May, 1935, by James Kazan, electrical inspector of lighting for the California Highway Commission, indicates the

Highway Commission's interest in the decrease of accidents by means of highway lighting. Photographs of the lighting standards on Sunset Blvd., San Francisco, and on Sloat Blvd. and Bayshore Highway are used as illustrations.

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Spectacular Luminous Effects Possible With "Black Light"

Luminous Products Co., at 1700 Grove St., Berkeley, Calif., has issued a new pamphlet and catalog depicting uses of its luminescent paints and cosmetics which are used in connection with ultra-violet or so-called "black light." The uses to which this luminous material may be put are listed as including spectacular stage productions, magical illusions, exhibits, striking displays of various kinds for fairs and expositions, paintings for the home and scenery for the stage, as well as decorative uses on statuary or objects in the home.

The material comes in several forms, including invisible enamels which when painted over pictures or materials are not visible to the naked eye until all visible light is cut off and only the ultra-violet or "black light" is provided. In addition to the invisible colors there are a wide range of visible colors which luminesce under "black light." These are provided in artist oil colors, process colors, theatrical make-up, printing ink and solutions for use in fountains as well as paper and fabrics.

Kits are made up including different combinations of colors and in some cases electric equipment to energize the luminous material. These energy producing sources include Photoflood lamps with special filter glasses, mercury vapor lamps, mercury vapor tubes and quartz tube units and 2-watt Argon glow lamps. A number of recent theatrical acts and several of the spectacular exhibits at the San Diego Fair employ the use of some of this material and lighting equipment.

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...in Merchandising

"Sample" Survey Reveals Appliance Opportunities

"Sample" figures, derived by regional or local surveys are often valuable as an index of market possibilities. In a recent talk to the Western Furniture Exchange, San Francisco, Elliott Hensel, advertising manager of the Oakland *Tribune*, spoke of the results of a recent survey made among 400 typical readers of that newspaper in the East Bay communities.

He told that the average age of automobiles owned by the people in that region was about four years and that the average age of radio sets was also found to be 4½ years. This would indicate that there exists a great market for new sets with the all-wave features. Of the 61 makes reported, 33 are no longer being manufactured.

Dramatizing the publicity on Black Widow spiders, the Cox Electric Co., at Red Bluff, Calif., told how lighted basements would prevent danger of bites, and sold many lamps and some wiring jobs too

The survey, he reported, showed that 66 7/10 per cent of the readers interviewed had no electric refrigeration, 47 per cent no electric washers and that of the total, 91 per cent used gas stoves, 3.4 per cent electricity to cook with and 2.3 per cent still use wood and coal.

Of those interviewed 11 per cent indicated that they were definitely going to buy something during 1935. Fourteen of these expressed a wish to buy a refrigerator, five a new radio, five a washer, twelve new furniture, sixteen a new automobile and eight a new stove. Interesting was that 47 per cent of those interviewed expressed no definite preference as to trade names or brands or as to where they would make their purchase. This, Mr. Hensel interpreted, has the opportunity for an individual dealer to advertise himself and attract this potential business to himself.

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• NORGE ranges, both electric and gas, arrived in the West during the past month and distributors have been busy bringing them to their dealers. The Leo J. Meyberg Co. in California has staged showings in all the key cities of the territory served by it, and reports excellent response by dealers and the public. Matched sets of range and refrigerator are expected to prove more popular with the advent of the new ranges.

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• WASHERTERIA is a new idea being tried out in Fort Worth, Tex. It is equipped with twelve General Electric washers and other home laundry facilities where upon payment of 35 cents housewives who do not own appliances of their own may bring their washing and do the complete job.

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• A LAUNDRY in Phoenix is listing the "hidden costs" of the home laundry in an effort to prove the economy of laundry service. Among these it lists blown fuses, accidental burns, scalds and crushed fingers and walls ruined by steam.

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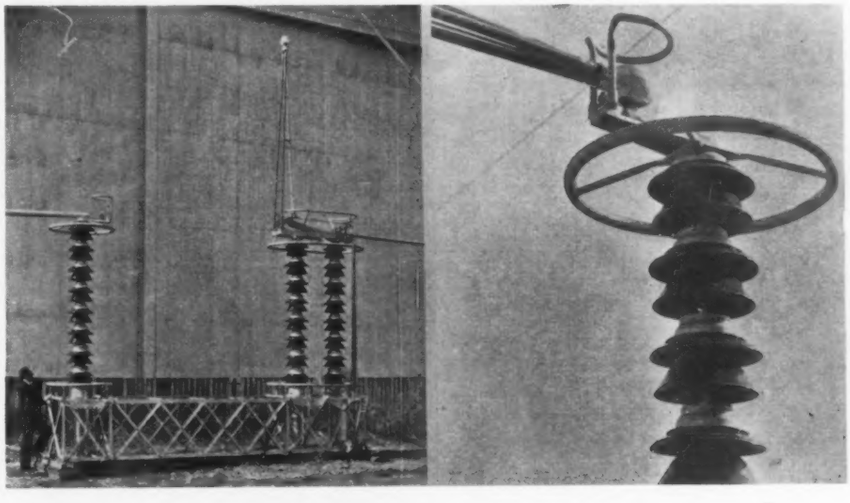
...in Engineering



287-Kv. Disconnecting Switches

At the left is shown one pole of the fourteen 3-pole, motor-operated, 287-kv. disconnecting switches manufactured by the Bowie Switch Co. for installation at the Boulder powerhouse switchyard. These units, the largest of their type in the world, are designed for reliability, ease of operation and minimum corona losses. At the right is shown a detail of the contact assembly with a rounded protective hood over the blade contact to prevent ice formation and other external deposits from "freezing" the switch

News of Note + + +

Revised Grand Coulee Plans Omit Power

A change order under which plans for the Grand Coulee dam are extensively altered was signed June 7 by Secretary of the Interior Ickes. The order calls for construction up to a height of 177 ft. of a complete foundation for the 500-ft. dam ultimately contemplated. The original plans called for construction at this site of a 297-ft. power dam and a permanent cofferdam, both of which eventually would be incorporated into the larger structure. The new plans abandon immediate power development and call for a dam which can be fitted more economically into the long range development of the Columbia River basin. This calls for construction of a high dam to create a reservoir 150 miles long to store 5,200,000 acre-ft. of water for use in irrigating about 1,200,000 acres of arid lands below the damsite and installation of power generators with a capacity of 1,890,000 kw. Construction of the high dam has not yet been authorized.

When the Grand Coulee contract was let it was planned to construct a low dam for hydroelectric power production pending the time when the Columbia basin project should be developed completely. Since then authorization of other power dams in the Pacific Northwest have reduced the need for an immediate power development at Grand Coulee. Another consideration in making the change was that engineering problems connected with binding the proposed high dam to the low dam would be much more serious than those connected with binding to the flat foundation surface now planned. Since excavation has been under way, rock slides from the cliffs above the streambed have demonstrated the advisability of completing the full foundation for the high dam immediately to avoid the future necessity of duplicating excavation work.

Work done by the contractors, Silas Mason Company, Inc., Walsh Construction Co. and Atkinson-Kier Co. to date can be utilized fully without waste in construction of the dam now planned. Of the $15,000,000 allotted by PWA for Grand Coulee, nearly $8,000,000 have been spent at the damsite in excavating and other preparations for actual mixing and pouring of the concrete.

The low dam at Grand Coulee would have cost $63,000,000, together with installation of generating equipment. Engineers of the Bureau of Reclamation estimate that the revised plans will call for a somewhat lower expenditure. While no generating equipment is called for in the new plans, foundations will be built for both power houses planned in connection with the proposed high dam. Original plans called for the construction of only one of these.

The original contract contained a provision authorizing alteration of the plans with no additional compensation to the contractors, except that additional excavation, concrete and other work should be paid for at the unit price bid therefor under the schedule. The revised plans, engineers predict, will call for the pouring of some additional concrete and also for additional excavation, since the original plans for the low dam contemplated leaving an area between the dam and the permanent cofferdam unexcavated. The increase over the previous plans in the amount of concrete to be used is due more to the necessity of providing for construction over the entire base area to a sufficient height (approximately 77 ft. above water level) to avoid flood dangers.

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New 287 Kv. Breakers

Entirely new in design, these 287 kv. breakers are part of the order placed with the General Electric Co. by the Los Angeles Bureau of Power and Light for its transmission line from Boulder Dam to Los Angeles. In the horizontal sections supported by the three post-type insulators is a new interrupting mechanism employing a cross-blast of oil across each of eight sets of contacts in series. Interrupting time is less than 3 cycles from the tripping impulse to the extinction of the arc. The design materially decreases the weight and needs but 5 per cent of the oil of the conventional tank-type circuit breaker.

Company Will Change From Holding to Operating Unit

Directors of the Nevada-California Electric Corp. have moved to reorganize as an operating utility, subject to stockholders' ratification. The action was taken to fortify the company's position if, when and as the projected holding company legislation becomes a law.

Arthur B. West, president of Nevada-California, stated in his 1935 report that "attention is called to the drastic and punitive provisions of the public utilities act of 1935. Notwithstanding your corporation has a clean record and has never been guilty of the abuses which are alleged as the occasion for the proposed legislation, it will be subjected to the punitive provisions of the proposed act and seriously handicapped in its future operations."

Although expressing a hope that the proposed legislation will be considerably modified as finally enacted, directors, to safeguard Nevada-California stockholders in their investments by changing the corporate setup so that the concern will not be affected, regardless of congressional action against holding companies, adopted a proposal to amend the incorporation certificate, whereby the company's status will no longer be that of a holding concern.

President West points out that Nevada-California systems are now interconnected with common generating sources, and directed by a single management in the service of contiguous territory; that the corporation's ownership of all outstanding bonds of subsidiary operating companies facilitates the contemplated change. This situation, and the fact that provision is made in the mortgage indenture of the corporation for taking over by the corporation of properties and business of operating companies, makes it feasible to carry through the plan without the necessity of refunding or retiring any of the corporation's outstanding bonds or other securities.

In addition to asking authorization to proceed with the reorganization program, directors, in the notice of the special meeting recently mailed, announced that a vote would be taken on the proposition that Nevada-California's executive committee be empowered to "take any and all steps and proceedings, and to incur such expenses as they may deem necessary and proper in opposing the threatened federal legislation, affecting the corporation and its subsidiary companies, and in protecting their constitutional and other rights."

Coast Utilities Continue Refunding Operations

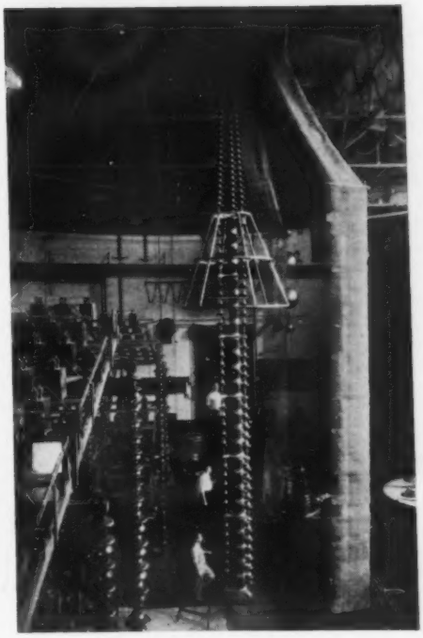
Continuing to take advantage of lower interest rates and the increasing demand for high grade investment securities, several Pacific Coast utility companies have announced refunding plans during the last month. Included are the Pacific Gas and Electric Co., the Southern California Edison Co. and the San Diego Consolidated Gas & Electric Co.

Pacific Gas and Electric Co. filed with the San Francisco office of the Securities and Exchange Commission a registration statement covering a proposed new issue of $30,000,000 par value of its first and refunding, series C, 4 per cent bonds, due Dec. 1, 1964. Proceeds from the sale of these bonds will be used to effect the retirement of $7,416,000 of Sierra and San Francisco Power Co. second mortgage bonds. These have been called for redemption on July 1 at 105 and accrued interest. Consideration is being given to calling for redemption as of Aug. 1 at 103¾ and accrued interest all outstanding unifying and refunding mortgage, series D, 5 per cent bonds of 1957 of the San Joaquin Light & Power Corp., of which $22,047,000 are outstanding, and also all Midland Counties Public Service Corp. first mortgage 5 per cent bonds of 1957, of which $2,257,000 are outstanding.

The total of these three issues is $31,720,000 which, plus the redemption premiums, indicates a total cash requirement of approximately $33,000,000. One effect of the plan would be to reduce the total outstanding indebtedness by $1,720,000. Any deficiency between the amount realized from the sale of the new bonds and the cost of redeeming the old bonds would be covered by cash from the company's treasury.

On June 10 the Southern California Edison Co. filed a registration statement and prospectus for $35,000,000 in principal amount of 3¾ per cent refunding mortgage bonds due July 1, 1960. The funds realized from the sale of these securities will be used for the purpose of redeeming $32,000,000 in series 5's due in 1952 at 105 and accrued interest to Sept. 1, 1935.

San Diego Consolidated Gas & Electric Co. has offered $15,500,000 first mortgage 4 per cent bonds due in 1965 at a price of 101 and accrued interest. The purpose of the new issue is to consolidate all of the company's outstanding bonds bearing interest at the rate of 5, 5½ and 6 per cent. These have been called for Aug. 15 and Sept. 1 at prices ranging from 101 to 105.



To defend the Boulder Dam transmission line against lightning, General Electric is making 12 of these giant Thyrite arresters. Rated at 287-kv., each arrester is 45 ft. high and weighs 4,500 lb. The strip of brass wire cloth was used in artificial lightning tests in the high-voltage laboratory at the G-E Pittsfield works

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B. C. Electric Rebuilds Lines Wrecked by Storms

British Columbia Electric Railway Co. is still at work in the Fraser Valley area of the province completing restoration of services which were crippled or wiped out during the severe winter. Steps are being taken to make power lines stronger so that a similar winter would not cripple the system so badly, according to V. Vilstrup, acting plant manager for the B. C. Electric.

The main 34,600-volt power circuits along the interurban railway line are being reinforced; steel reinforced aluminum conductors are being installed on the circuit from Matsqui substation to Abbotsford; the high voltage circuit from Matsqui to Chilliwack is being rebuilt with steel reinforced conductors; decayed poles are being replaced; and a new transformer station is under way at Langley Prairie.

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• To discourage theft of electrical current, the Seattle City Council has passed an ordinance providing a maximum penalty of 90 days in jail and a $300 fine for persons convicted of using meter-tampering devices. The ordinance applies to any tampering with an electric, gas or water meter of the city or of private companies.

Washington to Vote on $30,000,000 Power Bonds

Voters in the November, 1936, election in Washington will be called upon to pass on bonding the state up to $45,000,000 for flood control and electric power transmission lines. The 1935 legislature passed resolutions placing the two proposals on the ballot. One called for $15,000,000 in general obligation bonds to be used in controlling floods which ravage Washington counties each winter.

The second would authorize the state to bond itself up to $30,000,000 for power transmission lines for distribution of power produced at Grand Coulee dam in central Washington. The latter proposal promises to be bitterly fought with political factions in the state divided on whether the state or federal government should build the power lines and wholesale and retail the power. At the same time it votes on the power bonds, the public will ballot on putting the state in the power business.

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• Petitions Defaulted—After a great deal of preliminary publicity which resulted in an abundance of names signed to petitions, the City of Denver still did not have a chance to vote on a charter amendment which would have put the community into the electric and gas business. Reason: One of the sponsors of the measure removed or destroyed 47 petitions from the safe in which they had been deposited, reducing the number of signatures below that sufficient to put the bill on the May 21 ballot. His attorney had advised him that he would be a party to any legal action which might develop if Public Service Co. of Colo. or other interested individuals chose to attack constitutionality of the measure or methods of procedure. Several phases of the projected bill were said to have been actionable and the sponsor "chose to run" rather than face impending litigation.

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• Los Angeles City Council has voted approval of the action of the city's Water and Power Commission in finally closing with the Southern Sierras Power Co. and other land holders for the acquisition of water resources in the Mono Basin and Owens River Valley. The final payment was $2,180,000, with the entire transaction involving approximately $6,000,000. The city will develop the water resources of the property acquired to add to the Los Angeles municipal water supply system.

Call For Bids on Second Boulder Dam Power Line

Advertisement for bids by the Metropolitan Water District of southern California for the construction of a 230-kv. transmission line marks the launching of another important phase of the Colorado River power development. Until August 20 the District will receive bids for the construction of approximately 237 miles of transmission line and the furnishing of steel towers, porcelain insulators, and copper or aluminum conductors therefor. This line will transmit power from the power plant at Boulder Dam to the five pumping plants on the Colorado River Aqueduct. Bids will also be taken August 27 for constructing 140 miles of woodpole telephone line connecting the power plant at Boulder Dam with the telephone system on the aqueduct.

The power line will consist of a single three-phase circuit of either 500,000 cir-mil hollow copper conductors or 795,000 cir-mil steel reinforced aluminum conductors supported by porcelain cap-and-pin type insulators on steel towers of the conventional rigid type. Bidders will be given an opportunity to quote prices for the construction of the line with copper conductors, with aluminum conductors, with towers designed by the district, and with towers designed by the bidder. This will give the district a chance to select the type of construction which will give the lowest cost for the completed line.

In order to obtain the costs of these various types of construction it was necessary to prepare two complete designs for the line, one for hollow copper conductors and one for steel-reinforced aluminum conductors. The tower spacing for copper is about five towers to the mile and for aluminum about four towers to the mile.

It is expected that actual construction work will be started early in 1936 and that the line will be completed and ready for operation by 1938. Estimated cost of the line is $5,000,000.

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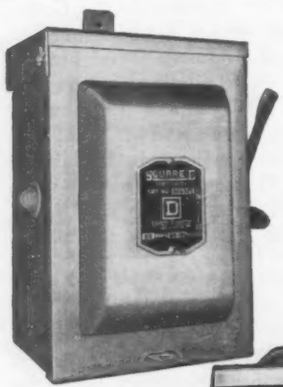
California Governor Vetoes Revenue Bond Measures

Because they violated "the fundamental principles of sound economics and well established constitutional limitations," two revenue bond measures passed by the California Legislature were vetoed in written messages prepared by Governor Frank Merriam. Each bill provided for the issuance of bonds by majority vote for the purpose of acquiring or constructing publicly-owned utilities.

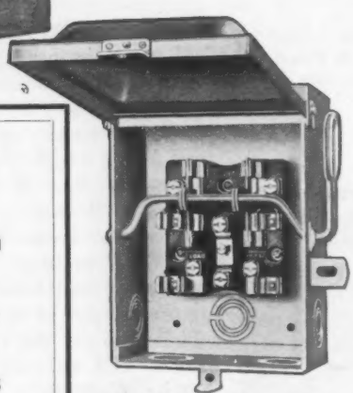
In his message the California governor called attention to the defeat of similar charter amendments by the voters of both Los Angeles and San Francisco, in the latter case on three different occasions. He characterized the constitutional provisions that bond issues should require a two-thirds majority as a salutary and precautionary restriction that had protected the credit of the state and its governmental subdivisions.

"Public borrowing and spending," he said, "should not be made easier. California's experiences with bonded debt of irrigation and reclamation districts teaches us that public debt is not to be lightly incurred. Reports show that at the beginning of the year 1934, the total sum of bonds and interest in default, together with outstanding registered warrants in irrigation and reclamation districts, amounted to many millions of dollars."

Lack of restrictions on underwriting and promotional expense, failure to provide for investigation or approval of a given issue, either as to legality or safety and the fact that the bonds were made legal investments for savings banks were among the other reasons cited for the veto.



SQUARE D
weatherproof
OUTDOOR TYPE
SAFETY
SWITCH



Affords safe protection against excessive moisture conditions

Requires no protective enclosure, regardless of exposure.

Illustrations show outdoor safety switch with hinged cover in closed and open positions.

Square D engineers, in perfecting the outdoor type safety switch, have fulfilled a distinct demand for a suitable and safe, wet-proof and weatherproof switch for control of light and power.

For domestic and commercial applications both indoors and out, wherever moisture conditions are a hazard, in rainy, foggy, steamy or misty atmosphere, these Square D Safety Switches afford weatherproof control without requiring protective enclosures. They are particularly practical for outdoor meter service entrance requirements where it is now common practice to install outdoors both meter and main disconnect switch. They are ideally suited for installations in breweries, dairies, mines, yards, parks, playgrounds—in fact, in any location where water condensation makes other switch installations impractical.

Here are a few of the features of the Square D outdoor type safety switch: weatherproof hinged cover with wide overlapping flanges; water-tight bushings around operating handle; extra heavy galvanized steel box, aluminum painted; provision for locking cover against tampering; provision for locking operating handle in "off" position; removable cover for ease of wiring; all knock-outs located below lowest level of live parts; all switch parts cadmium plated. Capacity 30-200 amperes.

CALL IN A SQUARE D MAN

SQUARE D COMPANY
ELECTRICAL EQUIPMENT
INC.
LOS ANGELES · SAN FRANCISCO · DENVER · HOUSTON
SQUARE D COMPANY · DETROIT · MILWAUKEE

Puget Sound Wins Rural Electrification Award

Puget Sound Power & Light Co. was awarded the Thomas W. Martin rural electrification bronze plaque at the Edison Electric Institute convention at Atlantic City. This award was presented for making the greatest contribution to the advancement of rural electrification during 1934.

The company operates approximately 10,000 miles of rural lines covering 15,000 sq. mi. between the Columbia River and the Canadian border. More than 40 per cent of its customers are outside of incorporated towns and cities.

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Mason City Heating Costs Eight Dollars at Three Mills

The average cost for electricity for heating, cooking, hot water and lighting a four-room house for January was $8 in Mason City, the contractors' town at the Grand Coulee dam 92 miles from Spokane, according to the reclamation publication of the Department of the Interior.

The rate charged consumers by the MWAK company is three mills per kilowatt-hour, and results covering the four-month period ended with February were said to have been satisfactory.

Continuous heating tests are being conducted by the engineering experiment station of the Washington State College, the contractors having set aside 16 houses for the purpose. All types of heaters are being tested, together with insulation material. An electrically heated furnace for experiment with heat storage during the off-peak periods also is being operated.

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• ANAHEIM CITY HALL and high school are now completely electrified, including electric heat, as a result of study of the load characteristics of the city lighting system. It was found that without adding to its substation equipment electric heat could be provided for the city buildings and the high school, since this new load would fill a valley in its existing system demand and balance the night lighting load. The city council became convinced of this efficiency in selling the school board and was so convinced that it decided to apply the same principle to the heating of the city offices. Anaheim buys its power wholesale from the Southern California Edison Company.

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• GLENN H. SMITH, engineer for the Seattle Lighting Department, has gone to Washington, D. C., for three months to aid Morris L. Cooke, administrator of rural electrification for the federal government.

STEP UP YOUR SALES

with L&H Electric Ranges

Here's the balanced, distinctive line for ready sale and maximum turnover. Exclusive features . . . readily demonstrated..help you *step up* sales and increase your profit per unit.

L&H Airspeed Units are famous for their *quick heat*, evenly distributed. No other type of unit is faster or more *economical*.

Handy Cooker or Cook-a-dor, complete six-quart electric cookers furnished as optional equipment.

No. 8500 (above) . . . the finest range you can sell

With Built-in Time-a-ture that provides *complete* automatic operation combined in one unit—Clock, Temperature Control and Time Control. And other new features that produce sales response.

Get the facts now!

L&H offers new smartness, styling, salability. Striking *eye appeal* in Silver, Green and Amber Pearl finishes that arouses admiration..that makes women buy. And *built-in* quality which furthers the L&H Electrics reputation as the 'low service cost' line. Wire or Write.

L&H Advanced ELECTRIC RANGES

A. J. LINDEMANN & HOVERSON CO.

613 W. Cleveland Ave. Milwaukee, Wis.

NEW YORK CHICAGO SAN FRANCISCO

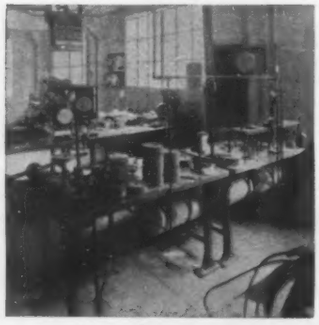
RECONDITION
Your Old Recorders
NOW!

DON'T WAIT as one company did, until the recording pens of your faithful old Bristol's Recorders are worn down to a blunt edge by long years of service. Recondition them now. Give them new life to serve you for many years to come.

If your processing today is carried out at temperature or pressures different from the ranges for which your Bristol's were originally installed, re-standardization is recommended.

The fee for this service is so modest that it will appeal to you. Just pack recorders carefully and ship to 311 Minna St., San Francisco. Send order to nearest branch office.

Bristol's West Coast Service Laboratory and Assembly Plant



THE BRISTOL COMPANY
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747 Warehouse St., Los Angeles
Branch Factory: 311 Minna St., San Francisco

TRADE MARK
BRISTOL'S
REG. U. S. PAT. OFF.

P. C. E. A. Officers and Committees Named for New Term

F. O. Dolson, vice-president and general manager of The Southern Sierras Power Co., Riverside, Calif., was elected president of the Pacific Coast Electrical Association for the administrative year 1935-36 at the annual meeting of that organization held in San Francisco, June 20. At a meeting of the board of directors following the annual meeting, R. M. Alvord, San Francisco district manager of the General Electric Co., and Harry L. Harper, Pacific Coast manager of Graybar Electric Co., Inc., were elected vice-presidents and N. R. Sutherland, Pacific Gas and Electric Co., was elected treasurer.

Directors of the association elected for a 2-year term were as follows: R. M. Alvord; D. E. Harris, vice-president, General Electric Supply Corp.; F. B. Lewis, vice-president and general manager, Southern California Edison Co.; A. H. Markwart, vice-president, Pacific Gas and Electric Co.; W. R. Marshall, vice-president, Westinghouse Electric & Manufacturing Co.; H. L. Masser, vice-president, Los Angeles Gas & Electric Corp.; A. F. Morairty, assistant general manager, Central Arizona Light & Power Co. and N. R. Sutherland.

In his annual report, retiring President Markwart pointed to the revival of interest in the association and its activities since the reorganization in 1934. He reported a substantial gain in membership for the year with a total now in excess of 2,300 members. Commenting upon the association and its possible future activities, Mr. Markwart said:

"The activities inimicable to private enterprise, by groups allied to government, are of the gravest concern, not only to the owners of the utilities but also to their employees. Both should realize the moral and economic gravity of the situation which faces them. And too, the threat of government interference in and competition with private business does not by any means threaten the utilities alone. We have seen in the TVA just how it affects the manufacturers, wholesalers, contractors, and dealers. Even if this governmental hamper to private enterprise were restricted to utilities alone we cannot fail to recognize that it still would have indirectly a very adverse affect upon the business of the other branches of the industry because the entire industry is so closely knit that it progresses or is retarded as a unit.

"While probably it is beyond the province of one stepping aside, I am taking the liberty to suggest that this national public relations problem is the most important one confronting the utility industry and that it is also one of great importance to the electrical industry as a whole. In my opinion, therefore, what the electrical industry needs more than anything else is a plan which will counteract the efforts of the administration, politicians and bureaucrats to injure the utilities and discredit them in the eyes of the public. Our problem is to regain that favorable public opinion enjoyed for so many years, and now all but lost through pernicious and organized attack. I even express the hope that the plan which might be developed locally will be so sound as to have a national value, and so appealing to the millions of public utility employees as to enlist their support in a nation-wide campaign of resistance against this onslaught on the utilities. The public must be enlightened as to the true inwardness of the matter through the carrying out of some plan which will discount or render impotent the inspired and outrageous propaganda of allied governmental groups, which will nullify their adverse influence and which will reveal to the public the real menace that is being concealed in the racket of professional politics."

Victor H. Hartley, managing director of the association, in his report reviewed the activities of the organization's subsidiary, the Pacific Coast Electrical Bureau. He pointed out the increasing interest in the Bureau's standard electrical ordinance and substandard appliance ordinance. An increasingly large number of communities has adopted one or both of these codes but a survey of the territory of the association shows many communities have electrical ordinances woefully out of date. Revived home construction has increased the number of applications for Red Seal wiring certificates, he reported.

Organization of the association for the coming year was announced by President-elect Dolson as follows:

Business Development Section: W. C. McWhinney, general commercial manager, Southern California Edison Co., chairman; A. H. Nicoll, San Francisco district manager, Graybar Electric Co., Inc., vice-chairman.

Operating Economics Section: K. B. Ayres, San Diego Consolidated Gas & Electric Co., chairman; A. W. Copley,

Pacific Coast engineering manager, Westinghouse Electric & Manufacturing Co., vice-chairman.

Red Seal and Ordinance Committee: D. E. Harris, vice-president, General Electric Supply Corp., chairman; W. L. Frost, vice-president, Southern California Edison Co.; C. E. Heise, Westinghouse Electric & Manufacturing Co. and W. F. Neiman, Pacific Gas and Electric Co.

Budget Committee: R. M. Alvord, chairman; F. B. Lewis and one other member to be selected.

Membership Committee: George C. Tenney, *Electrical West*, chairman; E. C. Jones, Southern California Edison Co.; Paul Suransky, Pacific Gas and Electric Co.; Herbert Dewes, Southern Sierras Power Co.; A. E. Strong, Coast Counties Gas & Electric Co.; J. M. Buswell, San Jaoquin Light & Power Corp.; W. H. Talbott, San Diego Consolidated Gas & Electric Co.; D. L. Scott, Los Angeles Gas & Electric Corp.; A. F. Morairty, Central Arizona Light & Power Co.; W. W. Glosser, Hubbard & Co.; H. H. Fogwell, Thermador Electrical Manufacturing Co.; R. J. Holterman, Westinghouse Electric Supply Corp.; H. P. Harris, Listenwalter & Gough; F. E. Boyd, Pacific Electric Motors Co. and A. H. Gudie, Biddle Trade Bureau.

Plans for the new administration year will be announced by President-elect Dolson in an early issue of *Electrical West*.

A typical meeting, (this one was at Stockton) of the "miniature conventions" of the P.C.E.A.

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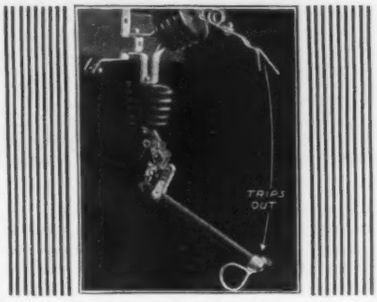
• CONSTRUCTION of a new 20,000 hp. substation at Tadanac, B. C., has been commenced by the West Kootenay Power & Light Co., Ltd., under the supervision of R. Moncrieff. A second substation is planned at the Stoney Creek pumping station. It will have a capacity of 12,000 hp. An extension to the switching station at Tadanac will also be undertaken. The company is carrying out all the work by itself. The development by the West Kootenay Power & Light Co. is associated with the recent announcement by the parent company, the Consolidated Mining & Smelting Co., that it was proceeding with a $2,000,000 addition to its plant.

WHERE TO BUY . . . IN THE WEST

KEARNEY
TRIP OUT
FUSE SWITCH



Point pressure contacts — outage indicating — air gap separation of contacts — no cartridge burnouts — positive and accurate performance.

Write for Latest Bulletin

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO.

LAPP
Line Post Insulators

Lapp Line Post Insulators eliminate radio interference due to both dirt and electro-static conditions.

Write for Bulletin No. 112 describing and cataloguing these insulators.

LAPP INSULATOR CO., Inc.
Le Roy, N. Y.

LOCUST PINS

Oak Brackets and Pole Steps

Safety • Strength • Lasting Economy

LOCUST PIN CO.
FRONT ROYAL, VA.

McLAUGHLIN

For Telephone and Telegraph Lines.

GLASS INSULATORS

PROVIDENCE INSULATED WIRE CO.

Manufacturers of
Type AEIC Service Entrance Cable

PROVIDENCE

Samples and Prices on Request

Concentrically wound bare neutral conductor, galvanized oval armor, weatherproof and flame-proof finish.

For use on entrances without conduit.

Proof Against Theft of Current

PROVIDENCE INSULATED WIRE CO.
PROVIDENCE, R. I.

MAYDWELL & HARTZELL
INCORPORATED
FACTORY DISTRIBUTORS
LOS ANGELES SAN FRANCISCO

...about People

Vancouver Electric Club Elects New Officers

Robert Hedley, sales manager, Neon Products of Western Canada, Vancouver, B. C., was recently elected president of the Vancouver Electric Club. John Priestman, assistant secretary of the Electrical Service League of British Columbia was appointed as vice-president, with F. Crosby, Northern Electric Co., as secretary, and John Taylor, B. C. Electric Railway Co., merchandising division as treasurer. All four officials have had considerable experience in other offices of the club.

Members of the board of directors in addition to the four officers are: C. Morden; F. Smith, merchandising manager, Northern Electric Co.; E. Ackland, illumination engineer, Canadian General Electric Co.; E. E. Walker, sales engineer, B. C. Electric Railway Co.; R. Hall, secretary Electrical Service League of British Columbia; G. W. Firth, electrical contractor; T. H. Crosby, sales engineer, Canadian Westinghouse Co.; L. Stacey, Vancouver representative, Packard Electrical Co.; and H. L. P. Brooks, credit manager, Canadian General Electric Co.

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Denver Industry Mourns Death of Allen Cornell

Death struck suddenly April 22 to end the active career of Allen C. Cornell, 51, who, for many years had been an outstanding figure in the Rocky Mountain region's electrical industry.

Mr. Cornell was riding horseback near his mountain home at El Creek Falls, Colo., when seized by a heart attack. Though "Al", as he was known to thousands of the electrical clan throughout the nation, had retired as manager of the Graybar Electrical Co., Denver, several months ago, his health was not believed seriously impaired.

One of the early chairmen of the Electrical League of Colorado, Mr. Cornell continued his affiliation to the time of his death. He was a power in the Rocky Mountain Electrical Assn. In the recent reorganization of R.M.E.A. and Electrical League to foster the 1935 Tri-State Business Development program, he was chosen a member of the potent Advisory Council which supervises all activities of the joint enterprise.

Mr. Cornell, born in Rochester, N. Y., graduated from Washington University with an electrical engineering degree. His qualities as a salesman and executive brought him advancement with Western Electric Co. until, in 1917, he was transferred from St. Louis to Denver as district manager for the Graybar Co., a position he held until March 4 of this year when he was granted a leave of absence. J. A. Mayer, formerly of Oklahoma City, became local manager and is regarded as Mr. Cornell's permanent successor.

Charles E. Nolan, sales manager of the Hawaiian Electric Co., Honolulu, is a frequent visitor to the mainland. He just returned to the Islands after an extended business trip which took him as far East as Bridgeport. Here he is at the Hotpoint factory in Chicago, snapped in a jovial mood after an electrically-cooked dinner

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• LLOYD A. GATES, for several years illuminating engineer with the incandescent lamp division of the General Electric Co. of Los Angeles, Calif., has taken a similar position with the Graybar Electric Co. at Los Angeles.

•

P. F. PICKETTE, formerly distributor here for Delco appliances and Frigidaire, is reentering the business of distribution of the former in Spokane, Wash., after having been out of it since 1933. His operations are under the name of P. F. Pickette and Co. A wholesale and retail business will be done at S. 751 Lincoln. Eastern Washing, Northern Oregon, Idaho and Western Montana will be included in the distribution territory.

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• BURT E. HOOPER, pioneer engineer in electrical development in California during the early years of the present century, notably with the Mt. Whitney Power Co., and later with the Independent Light & Power Co. in San Francisco, died in Honolulu recently after a brief illness. For many years past he has been connected with the Hawaiian Electric Co.

Dearborn New Head of O.S.C. Engineering School

R. H. Dearborn, until recently head of the Electrical Engineering Department of Oregon State College, has been advanced to the post of Dean of the School of Engineering and Industrial Arts of that institution. Since 1933, when Dr. H. S. Rogers resigned, he has been acting dean of the Engineering School.

Dean Dearborn is nationally known both for his personal achievements in electrical engineering and for his success as an educator. Under his direction, and with the help of the strong faculty which he built up, the E. E. dept. at Oregon State has become recognized as one of the most outstanding in the country.

R. H. DEARBORN

Born in Salem, Ore., Dean Dearborn received his A. B. degree from Willamette University and his E. E. degree from Cornell, graduating from the latter with the class of 1900. His professional career, in addition to his connection with the faculty at Oregon State College, includes work with the Portland General Electric Co. and with the Public Service Commission of Oregon of which he was Electrical Engineer in 1914-1915.

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• W. J. GILMOUR has been appointed district agent at La Jolla for the San Diego Consolidated Gas & Electric Co., succeeding Jack Brown, who had taken a leave and who died June 7. Mr. Gilmour came to the San Diego company from Northern States Power Co. in 1923. His work during the past few years has been largely in charge of appliance repairs and in sales.

•

• E. H. CLARK, assistant purchasing agent, Northwestern Electric Co., attended the purchasing agents' national convention in New York City late in May and took the occasion to visit a number of Eastern manufacturing plants.

Los Angeles Electric Club Installs Officers

New officers to direct activities of the Los Angeles Electric Club during the 1935-1936 year were installed June 17. The officers are: President, B. F. Woodard, Southern California Edison Co.; vice-presidents, R. A. Hopkins, Westinghouse Electric & Manufacturing Co., J. P. Carson, Graybar Electric Co., H. L. Caldwell, Department of Water and Power; secretary-treasurer, W. E. Madden, General Electric Co.; sergeant-at-arms, R. A. Buckby, Southern Pacific Division, Incandescent Lamp Dept. of General Electric Co.; executive committee, E. W. Rockwell, Metropolitan Water District, Cliff Thorburn, Pacific Electric Railway Co., D. T. Leach, Columbia Steel Co., W. R. Dressler, Southern California Telephone Co., J. Grady Rollow, Los Angeles Gas and Electric Corp.

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• DONALD O'MELVENY, Southern California civic, business and financial leader and a director of the Southern California Edison Co., Ltd., since 1929, has been elected president of the All-Year Club of Southern California. Mr. O'Melveny succeeds Addison B. Day, president and general manager of the Los Angeles Gas and Electric Corp. Mr. Day becomes a member of the board of directors of the All-Year Club.

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• T. A. LA RUE has been transferred from Kansas City to the Denver branch of Graybar Electric Co. where he has been appointed service supervisor.

PROFESSIONAL SERVICES

BYLLESBY ENGINEERING AND MANAGEMENT CORPORATION
Consulting Engineers
General design engineering, investigations, reports and estimates, and construction supervision for new or modernization projects in the Utility or Industrial Fields.
231 South La Salle Street Chicago, Illinois

ELECTRICAL TESTING LABORATORIES
Electrical Photometrical, Chemical and Mechanical Tests. Inspection of Materials and Apparatus at Manufactory
80th St. and East End Ave., New York

ARTHUR R. KELLEY
CONSULTING ENGINEER
Reports and Valuations, Public Utility Industrial Properties
Edison Bldg. Los Angeles

...about the Trade

Side Door Pullman

Whether his newly appointed representatives in southern California, with customary southern California booster cordiality, stripped him of his return ticket so as to keep him in southern California so that he had to hop a freight home, at any rate Kenneth Curtis, president of Curtis Lighting, Inc., of Chicago, may be seen about to embark on a side door pullman from the Los Angeles freight yard. Trying to hold him back is Harry Barnard, who is associated with the Frank J. Airey Co. as illuminating engineer. The Airey company is representative in southern California and Arizona for Curtis Lighting, Inc. Mr. Barnard was formerly a Curtis Lighting man in San Francisco several years ago. While in southern California, Mr. Airey conducted Mr. Curtis to two electrical luncheons at which he was the principal speaker. These were the Ben Franklin Club and the Los Angeles Electric Club. Mr. Curtis also had an opportunity to discuss his line with Standard Wholesale Electric Co., of Los Angeles; Cook-Nichols Co., of Pasadena; and the Hollywood Wholesale Electric Co., of Hollywood, new distributors of the X-ray reflectors.

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• THE AUTOMATIC WASHER CO. has appointed the Western Supply Co., of Salt Lake City, Utah, as distributor for Automatic washers and ironers for the state of Utah.

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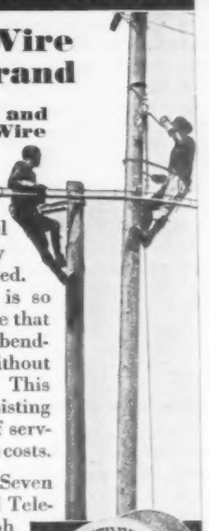
• LEE WRIGHT has been appointed sales representative for Republic Steel Corp., with headquarters at 401 Atlas Bldg., Salt Lake City. Prior to his connection with Republic, Mr. Wright had been associated with Zion's Co-operative Mercantile Institution, Salt Lake City, since 1902.

•

• STEWART ELECTRIC CO., Seattle, Wash., recently leased all of the space in a two-story building at 2400 1st Ave. S., which the firm has partially occupied for ten years. The company handles electrical machinery and does construction work also.

Crapo
GALVANIZED PRODUCTS

Seven Wire Steel Strand
Telephone and Telegraph Wire



Crapo Galvanized Steel Strand is quickly, easily and economically served. Its *pure zinc* coating is so adherent and so ductile that it withstands vigorous bending and twisting without cracking or peeling. This insures corrosion-resisting joints, longer years of service, lower maintenance costs.

Crapo Galvanized Seven Wire Steel Strand and Telephone and Telegraph Wire are available in all standard grades and sizes.

Indiana Steel & Wire Co.
Muncie, Indiana

Increase your connected load

by making fast-cooking ranges of the slow ranges on your lines. Prevent changing over to other methods of cooking. Both power companies and dealers find it profitable to install

CHROMALOX
SUPER-SPEED RANGE UNITS
Ask for details of the sales campaign.

EDWIN L. WIEGAND CO.
PITTSBURGH, PA.
Represented by
MONTGOMERY BROTHERS
911 Western Ave., Seattle, Wash.
524 S. W. Pine St., Portland, Ore.
61 Fremont St., San Francisco, Calif.
912 E. 3rd St., Los Angeles, Calif.
THE PETERSON COMPANY
1921 Blake St., Denver, Colo.

...in Engineering

New Toggle Type Switch

A new line of toggle type front operated switches, termed the NID line, has been announced by the Bull Dog Electric Products Co., Detroit. The line, the manufacturer reports, represents a new idea in switch mechanism, involving a flat steel actuating spring with frictionless knife-edge pivots that precludes wear and gives a fine snap-action to the mechanism. A further feature involves movable contacts of "toe and heel" type which engage with a wiping movement under practically toggle-lock pressure. This assures good conductivity and preservation of the contacts, which is further enhanced by "arcing tips" which absorb the arc in breaking, thus preserving the main contact surface.

•

Subway Cutouts

Two new type "FC" subway oil fuse cutouts rated at 2,500 volts, 100 amp. and 5,000 volts, 200 amp. have been announced by the G & W Electric Specialty Co., Chicago. A closed expansion chamber is used so that the cutouts are suitable for all subway installations and for locations exposed to corrosive fumes, explosive gases, salt air and inflammable dust. The larger size cutout clears 25,000 kva. in one-half cycle. Unit detachable sealed type potheads provide complete protection to the cable ends. A comparatively narrow width of tank also results in less wall space required.

•

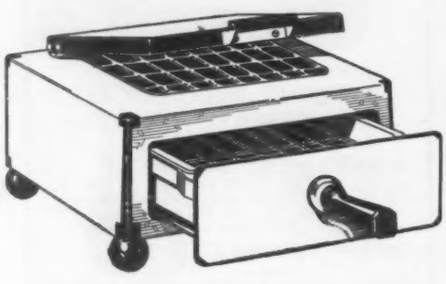
Contact-Making Voltmeter

General Electric Co. announces a new contact-making voltmeter for feeder voltage regulators, known as type TSB-20. Features of this new device are such that it responds more closely to system voltage requirements and eliminates needless operations, consequently increasing the life of both itself and the regulator, and reducing time and expense of maintenance.

•

Everhot "Kookmaster" For Table Cookery

Swartzbaugh Mfg. Co., Toledo, Ohio, has announced a complete table electric cooking unit for the kitchenette and small apartment cooking field. Known as the Everhot "Kookmaster" the appliance consists of a surface unit with a broiler drawer which will accommodate a 3-lb. steak or half a chicken. The broiler drawer will toast eight slices of bread at one time. Frying of all kinds may be done on the top unit. Other new Everhot appliances include casserole roaster and cooker. All of these three appliances are now being produced in a stainless "gunalloy" baked enamel finish.



Neon Pilot Lights

For telling when a motor, heater, electric clock, radio or toaster is operating either directly or in remote control circuits a line of small neon pilot lights operating on standard commercial voltages (90-250) a.c. or d.c. has been announced by Littelfuse Laboratories, Chicago. Conversely these pilot lights can be made to indicate open circuits or switches. The lights are equipped with octagon shaped bases similar to those used on switchboards. A limiting resistor is built into the mounting.

•

Automatic Voltage Adjuster

A new automatic generator-voltage adjuster for use with small a.c. generators, synchronous motors, synchronous condensers, and d.c. generators has been announced by the General Electric Co., Schenectady, N. Y. It consists of a voltage-sensitive element of the movable core solenoid type which directly operates through levers, wide-range, quick-acting rheostat. The rheostat is connected in the exciter shunt field circuit. The device has been developed to meet the need for an inexpensive regulating equipment where voltage regulating requirements are not too exacting.

•

Submerged Regulator

A new submerged regulator, known as type SS, which retains the basic features of the larger type S design but is simplified to reduce the cost so that it may be applied more economically to small capacity, low revenue circuits, has been announced by Westinghouse Electric & Manufacturing Co., East Pittsburgh. It has a maximum rating of 24 kva. It is equipped with a compensator type of primary relay offering both resistance and reactance in drop compensation. A feature of this compensation scheme is that in the use of two or three single phase regulators on a three-phase circuit no control wiring is required between regulators.

•

Line Truck

A 1½-ton truck, known as model HS, for use in line construction and other utility work, has been announced by the Four Wheel Drive Auto Co., Clintonville, Wis. There are 46 lockers in the body with a total of 96,440 cu. in. of space. All compartments are covered by heavy doors and are fully weatherproofed. Leather straps for carrying wire or rope, a winch protected by a collapsible cover and racks for pike-pole and derrick legs are standard equipment. The truck is powered with an 84-hp. engine and the transmission has four speeds forward and one reverse.

•

New General Electric literature includes three new bulletins covering various types of electrical equipment. Bulletin GEA-897E covers "Air-Cooled Transformers for Lighting and Power Service". "Demand Meters" are the subject of GEA 612B, which is one of the meter and instrument series published by this company. Bulletin GEA-1305C describes "Luminous-Tube Transformers" as well as time switches and cables for electric fan construction and operation.

...in Trade Literature

The New Science of Lighting is a new booklet prepared by Matthew Luckiesh and Frank K. Moss, Lighting Research Laboratory, Incandescent Lamp Department, G.E. Co., Nela Park, as a supplement and follow-up of "The Science of Seeing."

•

Standards on Electrical Insulating Materials—Published by the American Society for Testing Materials, prepared by committee D9 on electrical insulating materials. Paper bound, 284 pages, 6x9 in., price $1.75. For sale at A.S.T.M. headquarters, 260 Broad St., Philadelphia, Pa. This compilation presents under a single cover standards that are in widespread use for testing and evaluating electrical insulating materials. Includes the standards for testing molding powder used in the manufacture of molded electrical installations, a modified Baader saponification test for insulating oils and proposed specifications for rubber-insulating blankets for use on electrical circuits as well as the latest approved standards of tests for other insulators.

•

All Types of photographic studio lighting equipment for motion picture sound and commercial photography are described in bulletin No. 106 just issued by Kliegl Bros., New York. The bulletin gives a complete description of the various units, their light control features, applications and prices for motion picture studio work.

•

"Air Conditioning for Homes" is the subject of a bulletin soon issued by the University of California, Department of Agricultural Extension. Written for the information of the interested home owner, this report has been compiled under the auspices of the California Committee on the Relation of Electricity to Agriculture. The authors are Dr. B. M. Woods, Chairman of the Department of Mechanical Engineering, and Professor B. F. Raber of the same department.

Information includes discussion on comfort conditions, weather zones in California, the significance, for both cooling and heating, of insulation applied to walls and roofs, and the reduction of sun effect on glass and roofs. Attention is directed to the four main factors, the seven principal effects, and the twelve type equipments used in air conditioning. Selected systems of equipment are shown by drawings and explanations, and the present day approximate costs are given for installations offered by firms for two typical houses when insulated and when not insulated.

•

New Bulletin No. 1010 dated Jan. 1935, has just been issued by the Appleton Electric Co., 1701 Wellington Ave., Chicago, manufacturers of Appleton threaded and no-thread Unilets, also extension reels for electric cables, covering the new line of Appleton dead-end circuit breaking plugs and receptacles.

•

General Cable Corp., New York, has announced two new bulletins, one of which gives service statistics on "Peerless" weatherproof wires and cables. Non-Metallic and Metallic Armored Cable for direct earth installation are the subjects of Bulletin No. UC-1. Vacuum process lead sheathing is discussed in Bulletin LS-1.

ALL PRODUCTS manufactured by the Square D Co., Inc., Los Angeles, are described in an abridged catalog of 62 pages just issued by that company.

●

ELECTRIC RANGES and all electrical heated products manufactured by the Standard Electric Stove Co., Toledo, Ohio, are described in Catalog No. 35 just issued. This book covers equipment designed to serve the entire electric cooking field.

●

GENERAL CABLE CORP. has just published a new bulletin describing "Mid-Rip," a new quick separating flexible lamp cord known as type PO SJ. This cord is constructed with a tiny micro-slit on the two flat sides which may be used to separate the conductors for fastening to terminals. It is available in four colors.

●

ALLIS-CHALMERS MFG. CO., Milwaukee, Wis., has just published Bulletin No. 1172 entitled "The New Allis-Chalmers Quick-Clean Motor."

CENTURY POLYPHASE motors from 1/6 to 600 hp. are described in a new bulletin just issued by the Century Electric Co., St. Louis, Mo. Types of motors covered include open, enclosed, explosion proof, totally enclosed fan cooled, gear, splash proof, multispeed and general purpose. These motors were designed for the exacting requirements of air conditioning installations.

●

LEEDS & NORTHRUP CO., Philadelphia, has just issued a 24-page booklet on the application of electrical thermometers to the "efficient regulations of an air-conditioning system."

●

HOTPOINT'S advertising, promotional and educational activities for 1935 on electric ranges and water heaters are described in a 20-page portfolio entitled "The Turning Point," just issued by the Edison General Electric Appliance Co., Chicago. Described are the five national activities which are the basis for this year's hotpoint sales campaign.

THE ROLLER-SMITH CO., New York, has recently published Catalog No. 48 covering a.c. and d.c.; panel and switchboard type; 3½-, 4-, 7½- and 9-in. round pattern and rectangular, horizontal edgewise and illuminated dial ammeters, milli-ammeters, voltmeters, milli-voltmeters, pyrometers, single and polyphase wattmeters, frequency meters, power factor meters and accessories.

●

MERCURY ARC POWER RECTIFIERS, manufactured by the Allis-Chalmers Manufacturing Co., Milwaukee, are described in Bulletin No. 1169. Construction, operation and application of this equipment, which is of the Brown-Boveri design, are covered in the publication.

●

BULLETINS discussing cooling and air conditioning have just been produced by the Ilg Electric Ventilating Co., Chicago, Ill. One booklet describes the "Ilgattic" system of house cooling. The second discusses the "Ilgair" system of cooling and air conditioning.

WHERE TO BUY IT IN THE WEST

Air Conditioning
Frigidaire Corp.
General Elec. Co.
Graybar Elec. Co., Inc.

Anchors, Guy
James R. Kearney Corp.

Appliances, Household
Apex Rotarex Mfg. Co.
Edison Gen. Elec. Appliance Co., Inc.
General Elec. Co.
General Elec. Supply Corp.
Graybar Elec. Co., Inc.
Lindemann & Hoverson Co., A. J.
Malleable Iron Range Co.
Swartzbaugh Mfg. Co.
Westinghouse Elec. Supply Co.

Boxes
General Cable Corp.
General Elec. Co.
Russell & Stoll Co.

Brackets, Wood
Locust Pin Co.

Bus Fittings
Burndy Eng'g Co.
General Elec. Co.

Buses
Aluminum Co. of America ..

Cable Accessories
General Cable Corp.
General Elec. Co.
John A. Roebling's Sons Co.

Cables
Aluminum Co. of America
American Steel & Wire Co.
Columbia Steel Co.
Crucible Steel Co. of America
General Cable Corp.
General Elec. Co.
Graybar Elec. Co., Inc.
Maydwell & Hartzell, Inc.
Providence Insulated Wire Co.
John A. Roebling's Sons Co.
Westinghouse Elec. & Mfg. Co.

Carbon Brushes
National Carbon Co., Inc.

USE NATIONAL PYRAMID BRUSHES

A GRADE FOR EVERY TYPE OF BRUSH USING EQUIPMENT

COMPLETE STOCK PROMPT DELIVERY

San Francisco Brush Finishing Plant

National Carbon Co., Inc.
Carbon Sales Division
599 Eighth St.
San Francisco, Calif.

Carbon Products
National Carbon Co., Inc.

Central Station Equipment
Tom Wood

Chimes
Square D Co., Inc.

Circuit Breakers
General Elec. Co.
I-T-E Circuit Breaker Co.
Westinghouse Elec. & Mfg. Co.

Cleaners, Vacuum
Apex Rotarex Mfg. Co.
Clements Mfg. Co.
Cramer Elec. Co.

Coil Winding
Jeffries Transformer Co.

Compounds, Insulating
John C. Dolph Co.
General Cable Corp.
General Elec. Co.

Condensers, Electric
Allis-Chalmers Mfg. Co.
J. G. Corrin
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Controllers
Clark Controller Co.

Conduit
Aluminum Co. of America
General Elec. Co.
Youngstown Sheet & Tube Co.

Conduit, Underground
Fire Proof Wall Co.
Johns-Manville Corp.

Connectors
Burndy Eng'g Co.
James R. Kearney Corp.

Cutouts
James R. Kearney Corp.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Demand Control
General Elec. Co.
Wesix, Inc.

Distribution Specialties
General Elec. Co.
James R. Kearney Corp.
W. N. Matthews Corp.
Maydwell & Hartzell, Inc.
St. Louis Malleable Casting Co.

Electrodes, Arc Welding
John A. Roebling's Sons Co.
General Elec. Co.

Fans
General Elec. Co.

Farm Electrification Equipment
General Elec. Co.

Fittings, Conduit
General Elec. Co.

Fixtures, Lighting
General Elec. Co.
Russell & Stoll Co.
Smoot-Holman Co.

Floodlighting
General Elec. Co.
S & M Lamp Co., Inc.
Smoot-Holman Co.

Fuses
Trico Fuse Mfg. Co.

Gasoline
Union Oil Co.

Generators
Allis-Chalmers Mfg. Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Graphite Products
National Carbon Co., Inc.

Ground Rods
Crucible Steel Co.
Maydwell & Hartzell, Inc.

Heaters, Air
Edison Gen. Elec. Appliance Co.
Montgomery Bros.
Noblitt-Sparks Industries, Inc.
Sandoval Sales Co.
Thermador Elec'l Mfg. Co.
Wesix Inc.
Edw. L. Wiegand Co.

Heaters, Water
Edison Gen. Elec. Appliance Co.
Lindemann & Hoverson Co., A. J.
Malleable Iron Range Co.
Sandoval Sales Co.
Thermador Elec'l Mfg. Co.
Wesix Inc.
Westinghouse Elec. & Mfg. Co.

Heating Element—Repair Part
Mend-It Sleeve Mfg. Co.
Edw. L. Wiegand Co.

Illuminating Glassware
Inland Glass Works, Inc.

Instruments, Measuring and Recording
The Bristol Co.
General Elec. Co.
Quality Elec. Co.
Roller-Smith Co.
Westinghouse Elec. & Mfg. Co.
Weston Elec'l. Instrument Corp.

Insulation
General Elec. Co.
Johns-Manville Corp.
C. D. LaMoree

Insulators
Corning Glass Works
Graybar Elec. Co., Inc.
Hemingray Glass Co.
Illinois Elec. Porcelain Co.
Lapp Insulator Co., Inc.
Locke Insulator Corp.
McLaughlin Glass Co.
Owens-Illinois Glass Co.
Westinghouse Elec. & Mfg. Co.

Ironers
Apex Rotarex Mfg. Co.
General Elec. Co.
Ironite Ironer Co.
Mary Dowd Reardon Studios
Savage Distributing Co.
Gordon E. Wilkins

Lamps, Mazda
General Elec. Co.
Westinghouse Lamp Co.

Lamps, Student
Lumidor Mfg. Co., Inc.

Lamps, Sun
General Elec. Co.

Lighting Equipment
Smoot-Holman Co.
Wuelker Flexo-Dome Co.

Line Material
Maydwell & Hartzell, Inc.

Meters
The Bristol Co.
General Elec. Co.
L. A. Nott
Sangamo Elec. Co.
Westinghouse Elec. & Mfg. Co.
Weston Elec'l Instrument Corp.

Molded Material
C. D. La Moree

Motors
Allis-Chalmers Mfg. Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Motor Starters
Allis-Chalmers Mfg. Co.
General Elec. Co.
Ward Leonard Elec. Co.
Westinghouse Elec. & Mfg. Co.

Oil, Lubricating
Associated Oil Co.
Union Oil Co.

Oil, Transformer & Switch
Associated Oil Co.
General Elec. Co.
Union Oil Co.

Panel Boards
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Photoelectric Cells
General Elec. Co.
Weston Elec'l Instrument Corp.

Pins, Wood
Locust Pin Co.

Pole Line Hardware
General Electric Supply Corp.
Graybar Electric Co., Inc.
Hubbard & Company
Joslyn Co. of Calif.
Kortick Mfg. Co.
Locke Insulator Corp.
Maydwell & Hartzell, Inc.

Public Utilities
California Oregon Power Co.
Idaho Power Co.
Mountain States Power Co.
Northwestern Electric Co.
Pacific Gas and Electric Co.
Pacific Power & Light Co.
Portland General Electric Co.
Puget Sound Power & Light Co.
San Diego Cons. Gas & Elec. Co.
San Joaquin Light & Power Corp.
Southern California Edison Co. Ltd.
Utah Power & Light Co.
Washington Water Power Co.

WHERE TO BUY IT IN THE WEST

STANDARD ELECTRIC RANGES handled by
Arizona—Tucson: Albert Steinfield & Co. California—San Francisco: Kaemper-Barrett Corp., The Geo. H. Eberhard Co. Los Angeles: Listenwalter & Gough, Graham-Reynolds Elec. Co. Nevada—Reno: H. E. Saviers & Son. Utah—Salt Lake City: W. H. Bintz Co. Washington—Tacoma: Home Electric Co. Honolulu, T. H.—von Hamm-Young Co., Ltd.
Pacific Coast Sales Manager: **WM. P. SWARTZ**
629 S. Serrano, Los Angeles, Calif.

Pumps
Pelton Water Wheel Co.

Range Units
Edison Gen. Elec. Appliance Co.
Edwin L. Wiegand Co.

Ranges
Edison Gen. Elec. Appliance Co.
General Elec. Co.
General Elec. Supply Corp.
Lindemann & Hoverson Co., A. J
Malleable Iron Range Co.
Standard Elec. Stove Co.
Walker & Pratt Mfg. Co.

Refrigerator Parts & Accessories
California Refrigerator Co.

Refrigerators
Frigidaire Corp.
General Elec. Co.
General Elec. Supply Corp.
Graybar Elec. Co., Inc.
Malleable Iron Range Co.
Westinghouse Elec. & Mfg. Co.

Relays
General Elec. Co.
Leach Relay Co.
Ward Leonard Elec. Co.

Rheostats & Resistors
General Elec. Co.
Ward Leonard Elec. Co.
Westinghouse Elec. & Mfg. Co.

Switches, Time
R. W. Cramer & Co.
General Elec. Co.
Sangamo Elec. Co.
Tork Clocks, Inc.

Switchgear
Allis-Chalmers Mfg. Co.
Condit Elec'l Mfg. Corp
General Elec. Co.
Pacific Elec. Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Terminals, Cable
General Cable Corp.
General Elec. Co.

Testing Devices
Electrical Facilities, Inc.

Tools, Live Line
James R. Kearney Corp.

Transformers
Allis-Chalmers Mfg. Co.
American Transformer Co.
E. H. Bell
Gardner Elec. Mfg. Co.
General Elec. Co.
Jeffries Transformer Co.
Pennsylvania Transformer Co.
Sangamo Elec. Co.
Western Transformer Co.
Westinghouse Elec. & Mfg. Co.

Tubing, Elec'l Metallic
Aluminum Co. of America

★ **DEPENDABLE TRANSFORMERS** ★

For Dry Type Industrial and Signal Use

***Repair Service* for distribution transformers, Auto-starters and similar equipment.**

JEFFRIES **TRANSFORMER CO., 5706 Long Beach Ave., Los Angeles**
Electric Agencies, 2059 Webster St., Oakland, California

Service Organizations
Elec'l Testing Labs.
Fort Wayne Correspondence School
McGraw-Hill Book Co.
Northwest Elec. Light & Power Association
Pacific Coast Elec'l Ass'n
Pacific Coast Elec'l Bureau

Strand, Guy
Crucible Steel Co.
Maydwell & Hartzell, Inc.
Pacific Wire Rope Co.

Switchboards
Allis-Chalmers Mfg. Co.
General Elec. Co.
Square D Co., Inc.

Switches, Coin Operated
Welcome Meter Co.

Switches, High Tension
Bowie Switch Co.
James R. Kearney Corp.
General Elec. Co.
C. D. LaMoree
Pacific Elec. Mfg. Co.

Switches, Meter Test
General Elec. Co.
Meter Devices Co.

Switches—Pressure and Temperature
The Bristol Co.
Garland-Affolter Eng'g Corp.

Switches, Safety
Colt's Patent Fire Arms Mfg. Co.
Meyers Safety Switch Co., Inc.
Mongerson's Elec'l Mach. Works.
Parker Elec'l Mfg. Corp.
Square D Co., Inc.

Turbines
Newport News Shipbuilding & Dry Dock Co.
Pelton Water Wheel Co.

Valves
Pelton Water Wheel Co.

PARTS & ACCESSORIES
***For* SAVAGE** Washers & Dryers
- PROMPT DELIVERY
- COMPLETE STOCKS

Savage Distributing Co., Inc.
383 Brannan St., San Francisco

Washers, Clothes
Apex Rotarex Mfg. Co.
Elec't Appliance Service Corp.
General Elec. Co.
Little Giant, Inc., Ltd.
Savage Distributing Co.
Washing Machine Parts Co.

Authorized Factory Replacement Parts Service
●
Automatic, Easy, Gainaday, Horton, Meadows, Roto Verso and Universal Washers and Ironers
Parts and Rolls for All Makes
Washing Machine Parts Co.
1241 S. Hope St., Los Angeles

Water Wheels
Pelton Water Wheel Co.

Wire
Aluminum Co. of America
American Steel & Wire Co.
Columbia Steel Co.
Crescent Ins. Wire & Cable Co.
Crucible Steel Co.
Driver-Harris Co.
General Cable Corp.
H. B. Squires Co.
Westinghouse Elec. Supply Co.

Wiring Supplies
Associated Sales Engineers
Gen. Elec. Supply Corp.
Graybar Elec. Co., Inc.
Russell & Stoll Co.
General Elec. Co.
Graybar Elec. Co., Inc.
Hart Mfg. Co.
Indiana Steel & Wire Co.
C. E. Ingalls
Maydwell & Hartzell, Inc.
Pacific Wire Rope Co.
Providence Insulated Wire Co.
John A. Roebling's Sons Co.
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No. 1 of a Series

Reprinted from "In Gear"—the Pacific Gas and Electric Company's plan for united industry cooperation during 1935.

P·G·and E·

APPLIANCE SALES POLICIES

Adopted in 1925 . . . First published in 1927

We believe that the public must be served.

That best public service can only come from a united industry, composed of the utility, appliance manufacturers, jobbers and dealer trade.

That an organized effort by the entire industry is essential if the maximum amount of business is to accrue to each group through creation of consumer acceptance of our products.

That such a united industry can and will successfully compete with other organized industries to the end that a fair share of the public buying power will be obtained.

That it is the duty of the utility particularly to do pioneering selling in that appliance field where there is no public demand or due to special conditions no adequate retail profit for creative and aggressive selling by retailers.

That the utility, in addition to supplying quality service at fair rates, assume leadership in the sale of quality appliances at established retail prices, adhering to ethical, constructive merchandising methods on a basis that will encourage the activity of all legitimate retailers.

That such ethical leadership has stimulated and will continue to stimulate public buying of appliances, installation work, and general supplies.

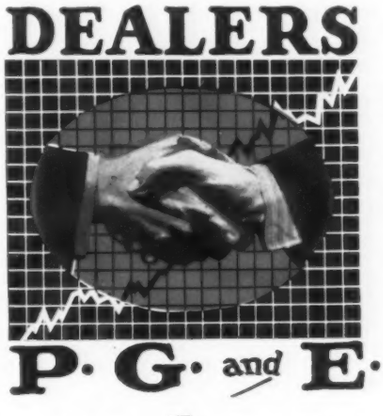
That it is the desire of the Pacific Gas and Electric Company to continue encouraging as many legitimate retail appliance dealers as can economically operate; to cooperate with such natural outlets by financing and executing constructive educational selling and advertising campaigns.

That merchants and dealers can and should retail appliances at prices fair to themselves and the public by such methods as have been found to be sound by successful retailers.

That the manufacturers and jobbers can best contribute to this plan by supplying well advertised merchandise of unquestionable quality at prices which permit the seller a legitimate profit margin.

The Pacific Gas and Electric Company will continue:

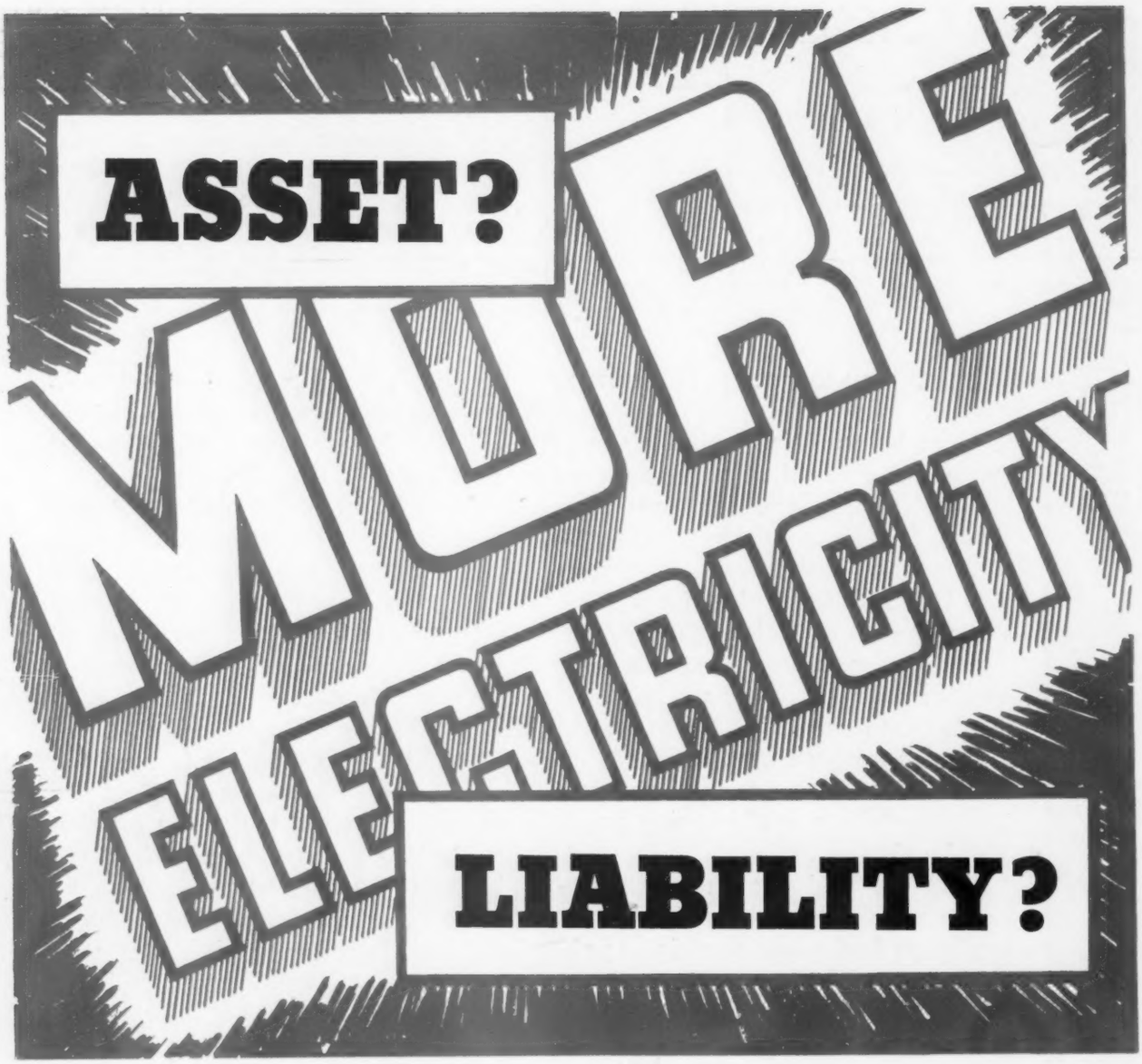
To keep an open mind. To be guided by facts. To hold out to all groups the right to full discussion. To hold to these policies we believe to be right but to quickly concede where we find we are wrong.



PACIFIC GAS AND ELECTRIC COMPANY

Owned, Operated, Managed by Californians

EW-107-735



Within the next few years a tremendous block of new electric power will be dumped in the California market—already equipped to meet the demands of normal growth for a number of years.

Electric power is of no benefit unless it is put to useful work. Appliances, motors, motor-driven machines, etc., are the media through which this new power must be employed.

Sound business requires that the power shall be sold profitably. There must therefore be greatly increased sales of appliances and energy-consuming devices. If the producers of power are to profit, obviously there must be profit for the producers and sellers of appliances. Never before has there been such opportunity for the industry, and never such a need for a UNITED INDUSTRY, with every individual doing his part.

This new power can become a California asset or a California liability. If it is to be an asset, there can be no "Let George do it" attitude by the industry or any of its members.

A concerted coordinated drive by a UNITED INDUSTRY will result in more wiring jobs for the contractor, increased appliance sales with profits to wholesaler, dealer, and retail merchant, and increased sales of KWH by the power company—*the surest way to convert new power into an asset.*

Pacific Coast Electrical Bureau

601 West 5th Street, Los Angeles ★ 447 Sutter Street, San Francisco